DEMOGRAPHIC, CLINICAL AND LABORATORY CHARACTERISTICS OF ATRIAL FIBRILLATION AS SEEN IN MEDICAL OUT-PATIENT CLINICS AT THE KENYATTA NATIONAL HOSPITAL

BY

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DECLARATION

This dissertation is My own original work and has not been submitted for a degree in any other university

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DEDICATIONS

To My God and Father for His grace and favour, which continue to open the way for Me through all of life's opportunities and challenges.

To My wife and companion Mary for the many sacrifices that it takes to see me through.

To the Joy of my days, Ciku, for a ready smile and welcome cheer.

To My Pastors for continued prayer and support.

To My parents for believing in Me and encouraging Me always.

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1 ABBREVIATIONS

AF- Atrial fibrillation

KNH- Kenyatta National Hospital

AV- Atrio-ventricular

CHF – Chronic Heart failure

AMI- Acute Myocardial Infarction

CAD- Coronary Artery Disease

DM – Diabetes Mellitus

ECG- Electrocardiography

LA- Left Atrium

TIA- Transient Ischaemic attacks

LV- Left Ventricle

FDA- Federal Drug Administration

ACC- American College of Cardiology

AHA- American Heart Association

ESC- European Society of Cardiology

ACCP- American College of Chest physicians

CHADS2- an acronym for Congestive heart failure, Hypertension, Age >75, Diabetes mellitus, and prior Stroke or transient ischemic attack

INR- International Normalised Ratio

KCCT- Kaolin-Kephalin Coagulation time

FDA- Food and Drug Administration (USA)

NSR- Normal Sinus rhythm

HHD- hypertensive heart disease

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2 ABSTRACT

Background

Atrial fibrillation (AF) is the Commonest sustained arrhythmia encountered in clinical practice with frequent hospitalizations. In Sub-saharan Africa it is presumed to be predominantly valvular.

Objective:

To determine Demographic, Clinical characteristics and treatment options utilised Ambulatory Atrial Fibrillation (AF) .

Design: A descriptive case registry

Setting: Medical out-patients at a tertiary referral hospital: Kenyatta National Hospital, Nairobi, Kenya

Subjects: Consecutive Medical Out-patient attendees

Methods:

Daily Case records perusal identified file label of AF from which demographic, clinical, electrocardiographic and treatment data was extracted and a comprehensive clinical evaluation and resting 12-lead ECG recorded .

Outcome Measures: Clinical cardiac diagnosis label, Treatment mordalities as rate or rhythm control strategy, anti-thrombotic therapy utilized and anti-coagulation intensity and monitoring over preceeding 6 months

Results:

Between 18th August and 14th November 7,608 files were perused and 211 AF cases enrolled; mean age of 48 yrs.73% were under 65yrs, 68% female. Clinically diagnosed AF had a period prevalence of ~3%. AF was found to be predominantly non-valvular in aetiology at 53%.It was commonly associated with Hypertension at 54%.Rate control was the commonest strategy in use at 83% and the vast majority of our patients were on antithrombotic therapy (60% on Warfarin and 20% on Aspirin) this was similar in VHD and NVHD. Majority of the patients were on 5mg of Warfarin, INR monitoring was only perfomed 2.5 times in six months and INR range 1.5-8, Mean 2.5
Heart-failure was the commonest recorded complication of AF recorded in this study at 47% thrombo-embolic phenomena followed at 12% and major bleeding episodes 0.2% and AF related hospitalization at 14%.

Conclusion:

AF is not uncommon in the ambulatory setting, mostly valvular in aetiology, being adequately addressed in terms of rate-control and antithrombotic therapy. Intensity of anticoagulation is adequate but it's monitoring is not. AF is complicated by heart failure and thrombo-embolic episodes.

3 BACKGROUND

3.01 DEFINITION

Atrial Fibrillation is a troublesome arrhythmia, and its electrocardiographic (ECG) characteristics are relatively well recognized. It is characterized by chaotic, rapid,discontinuous atrial depolarizations, resulting in rapid oscillations that are recorded as irregularly formed f waves in contrast to uniform P waves of sinus or other distinct supraventricular rhythms.

3.02 EPIDEMIOLOGY

Atrial fibrillation (AF) is both the most common sustained arrhythmia encountered in clinical practice and, recent data suggest, the most common arrhythmia-related cause of hospital admissions.
AF is a common condition in the elderly, with a prevalence which increases with advancing age reaching approximately 10% in those greater than 80 years .Atrial fibrillation is an important risk factor for stroke, leading to a 3–6 fold increase in risk compared to the general population.(1)

AF is also common in the setting of valvular heart disease especially diseases of the Mitral and Aortic valves. Tricuspid regurgitation is also a documented aetiological factor. AF Also occurs in Endocrine abnormalities.

Although health utilization costs related to AF are significant, little is known about its incidence and prevalence. Estimates indicate that 2.2 million Americans have AF and that 160,000 new cases are diagnosed each year. The incidence is higher in older adults, whose risk for developing AF is associated with advanced age. Diabetes, hypertension, CHF, rheumatic and nonrheumatic valvular diseases, and coronary artery disease are all associated with a higher incidence of AF. Left atrial (LA) enlargement is strongly correlated with increased incidence of AF, as is mitral valve calcification in patients older than age 60. AF commonly follows cardiac surgery and acute myocardial infarction (MI) and may be self-limiting. (2)
In the CARAF study, 198 (18.2%) of 1086 patients who were entered into the registry during 1991-1995 developed AF after open-heart surgery, whereas the AF of the remaining 888 was not surgically related. (3)

In our set-up AF is common in Valvular heart disease. Thirty-eight years into the Framingham heart study in 1994, 11.8% (562 patients) had documented AF, of whom 53% (298) were women. The incidence was higher in men (12.6%) than in women (11.3%). A 1991 report from this study noted that AF was more prevalent in older adults (ages 80 to 89), a 9% incidence, than in younger ones (ages 50 to 59), a 0.5% incidence, and this relationship continued in 1994, when there were 6.2 cases of AF documented for every 1000 examinations in men 55 to 64 years old compared with 75.9 cases in men 85 to 94 years old. For women, the incidence was 3.8 per 1000 examinations for those 55 to 64 years old and 62.8 for those 85 to 94 years old. (1)

Non-Valvular AF, rare in the first 2 decades, is almost always associated with an accessory pathway during fetal development. There may be spontaneous remission of the tachycardia in the first year of life. Similarly, in adolescents, rapid supraventricular tachycardias may degenerate into AF.

In a 1999 study, Garg et al found that of 18 young adults, 11 developed AF following supraventricular tachycardias. AV nodal reentrant tachycardia was documented in 4, focal atrial tachycardia in 2, AV reentrant tachycardia by means of an accessory pathway in 1, focal premature atrial beat in 1, and a combination of these in 3 patients. (4)
In patients who have multiple pathways, R-R intervals <250 ms and use of digitalis during AF may create higher risk of cardiac arrest. Competitive young athletes may have a higher incidence of AF than the average population. Furlanello F in Italy documented that AF episodes were more frequent in association with effort or exercise.(2)
In the Framingham Study, in the absence of any other disease, so-called lone or primary AF accounted for 11.4% of all AF.(2) Brand et al noted that 60% of lone AF episodes were associated with heavy alcohol use, suggesting facilitation by ethanol toxicity.(2) In Olmsted County, Minnesota, 97 (2.7%) of 3623 patients ages 60 years or younger were identified as having lone AF. (5)
In 1978 Coumel described an uncommon form of AF in Women that was precipitated by vagal influences and associated with sinus node dysfunction, there is usually underlying heart disease. Episodes classically occur during sleep or after eating and are refractory to treatment using B blockers or digitalis. Coumel also described infrequent adrenergic AF during the day, often preceded by exercise and emotional stress.

3.03 AETIOLOGY

The incidence is higher in older adults, whose risk for developing AF is associated with advanced age. Diabetes, hypertension, CHF, rheumatic and non rheumatic valvular diseases, and coronary artery disease are all associated with a higher incidence of AF Left atrial (LA) enlargement is strongly correlated with increased incidence of AF, as is mitral valve calcification in patients older than age 60. AF commonly follows cardiac surgery and acute myocardial infarction (MI) and may be self-limiting.
In the CARAF study, 198 (18.2%) of 1086 patients who were entered into the registry during 1991- 1995 developed AF after open-heart surgery, whereas the AF of the remaining 888 was not surgically related. (3)
Noncardiac conditions associated with AF include, but are not limited to, hyperthyroidism, diabetes mellitus, alcohol intoxication, use of cholinergic drugs, and pulmonary diseases, as are such factors as exercise, emotional stress, fever, electrocution, hypothermia, trauma, and muscular dystrophy.

Possible causation differs with age with non-cardiac conditions predominating in the Young <65 yrs. In the first two decades, AF may be associated with conduction abnormalities or with rheumatic valvular disease.

3.04 PATHOGENESIS

AF is a dysrhythmia of the atria, in which the atria stop contracting as they begin to fibrillate, or quiver, and become ineffectual in filling the ventricles, disrupting ventricular function, and subsequently, cardiac output.

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When sinus rhythm ceases to be the heart's driving force, ventricular responses also become irregular, reflecting the atrium's chaotic electrical activity. The ventricular irregular contractions, which have become either too fast or too slow, impair the cardiac pump, leading to a variety of symptoms usually attributable to these hemodynamic variances.
Even patients with asymptomatic AF have high incidences of such complications as stroke, congestive heart failure (CHF), and cardiomyopathy. The degree of irregularity in ventricular rate depends on several factors, including innate properties of the atrioventricular (AV) node, levels of sympathetic or parasympathetic stimulation, and whether therapies are aimed at treating AF through modifying properties of the AV node or those of the atria, or are simply aimed at treating concomitant conditions. (2)

3.05 MECHANISM

The mechanisms underlying human AF are not fully understood. Although it was first thought that irregular contractions of the atria are caused by either single or multiple ectopic foci, Lewis suggested that the cause may be impact of contraction waves and the production of localized areas of block.(2) In 1924 Garrey suggested that reentry had to be the mechanism of AF.(2)
In Moe's series of published studies in the early 1960s, he developed the multiple wavelet hypothesis as a possible mechanism of AF Evaluating the characteristics and qualities of AF in exposed canine hearts, Moe's initial studies examined and compared AF produced by vagal stimulation with AF induced by applying aconitine, a sodium channel agonist, to the atrial appendage. Although the 2 types of fibrillation looked similar, their mechanisms were quite distinguishable. In aconitine-induced AF, cessation of AF in areas of the atria isolated from the atrial appendage demonstrated that sustained fibrillation depended on attachment to the appendage.(6)
In vagal AF, atrial sections that were separated from the site of electrical stimulation maintained fibrillation, demonstrating that AF could remain stable, independent of its initiating events.
Moe's hypothesis envisioned multiple reentrant circuits of various sizes that "wandered" through the atria creating continuous electrical activity.(6)
In the multiple wavelet hypothesis, AF is characterized by fragmentation of a wave front into multiple, independent daughter wavelets that move randomly throughout the atrium, giving rise to new wavelets that collide with each other and mutually annihilate, or that give rise to new wavelets in a perpetual activity that resembles Brownian motion. (2)

The actual mechanism of atrial fibrillation is probably a focal source of automatic firing, a series of small reentrant circuits, or a combination of the two. Atrial fibrillation is triggered by atrial premature depolarizations, which frequently arise from muscular tissue in the pulmonary veins or other structures in the left or, less commonly, right atrium. Clinical factors such as hypertension, aging, and congestive heart failure, as well as recurrent atrial fibrillation itself, result in structural changes in the atria, including dilatation and fibrosis. This type of mechanical remodeling promotes the development and perpetuation of atrial fibrillation. Continued rapid electrical firing in the atria also results in loss of the normal adaptive shortening of atrial and pulmonary-vein myocyte refractory periods in response to the rapid heart rate, a process called electrical remodeling.
A single focal source has been described recently in some patients. The Pulmonary veins have been demonstrated to be the source of AF in most patients.

Recently, it has been demonstrated that at the cellular level, arrhythmogenic cardiac myocites have action potential shortening without a plateau phase that adapts poorly to changes in heart rate. A major mechanism for this is the reduction of the L-type calcium current, a feature consistently observed. This leads to the electrical remodeling of the myocardium (24).

3.06 CLASSIFICATION

The following classification of AF has been proposed by the ACC/AHA/European Society of Cardiology (ESC):

Paroxysmal (ie, self-terminating) *AF* in which the episodes of AF generally last less than seven days, usually less than 24 hours, and may be recurrent.

Persistent AF fails to self-terminate and lasts for longer than seven days. Persistent AF may also be paroxysmal if it recurs after reversion. AF is considered recurrent when the patient experiences two or more episodes.

Permanent AF is considered to be present if the arrhythmia lasts for more than one year and cardioversion either has not been attempted or has failed.

"Lone" AF describes paroxysmal, persistent, or permanent AF in individuals without structural heart disease. (8)

Canadian Registry of Atrial Fibrillation (CARAF) trial showed that there is invariably progression toward chronic AF Of 888 patients enrolled, 77% were classified as paroxysmal, but over a 5-year course slowly but steadily progressed from paroxysmal to chronic status. Takahashi et al, in following 94 (40%) of the patients with paroxysmal AF of their 234 patients with AF, found that AF became permanent in 1 year in 19 (20%). (3)

3.07 RISK FACTORS

The Framingham Study examined multivariate effects of age, alcohol consumption, body mass index, cigarette smoking, CHF, diabetes, hypertension, gender, left ventricular (LV) hypertrophy, MI, and valvular disease, finding that only body mass index and alcohol consumption were not significantly related to development of AF in the group studied. Each decade of age significantly increased risk by odds ratios of 2.1(1.8 to 2.5) for men and 2.2 (1.9 to 2.6) for women. The mean age of men who developed AF was 72 years; for women the average age was 75 years for those who had AF. Smoking was a significant risk factor only for women (an odds ratio of smokers vs nonsmokers of 1.4) (5)

CHF increased the risk for AF in both men and women by about five-fold in each . This exceeds the incidence in non-AF populations by factors of 6.1 for men and 8.1 for women. Women who had diabetes had a 2.1 increase in their odds of having AF. Among men who had diabetes, the odds were lower. After adjustment for other factors, men generally were 1.5 times more likely to develop AF

Hypertension is highly prevalent in both men and women who develop AF. This has been calculated as a 14% greater likelihood for AF when associated with hypertension.

LV hypertrophy is more common in men who developed AF than in those who do not and is even more common in women who develop AF compared with only 3.8% in women who do not (odds ratio 3.8). In the Framingham cohort, AMIs were more common in men and Women who developed AF. Valvular disease was associated with a significantly higher odds ratio for women than for men (3.6 vs 2.2), and women were more likely than men to have valvular disease whether they had AF (29.5% for women vs 16.7% for men) or did not (8.7% for women vs 6.7% for men).

3.08 CLINICAL FEATURES

AF symptoms reported frequently in patients include tiredness, heart fluttering, heart racing, "hard to catch" breath, shortness of breath, weakness, difficulty sleeping, and chest pain with heart fluttering.
Approximately 21% are asymptomatic. When patients are monitored to correlate an arrhythmic event with symptoms, those most often cited by patients in association with documented AF were palpitations, chest discomfort, lightheadedness or dizziness, shortness of breath, and diaphoresis.
But in a 1998 study by Gerstenfeld and Mittleman, the only clearly correlated symptom was palpitations. Lightheadedness, dizziness, presyncope, fainting, blackouts, and syncope are all symptoms of cerebral hypoperfusion. (7)
These symptoms are secondary to rapid ventricular responses to the AF. As mentioned previously, dangerous ventricular rate acceleration may lead to ventricular fibrillation, cardiac arrest, and death. Although these complications are rare, they are a real threat for patients who have short refractory periods. In addition to physical symptoms, AF can have a strong emotional impact on patients whose peace of mind and lifestyle are disturbed by frequent hospitalizations, uncertainty about timing of symptoms, and significant financial burdens.

3.09 CO-MORBODITIES

The co-morbidities in patients with AF are indistinguishable from it's aetiological factors. The incidence is higher in older adults, whose risk for developing AF is associated with advanced age, diabetes, hypertension, CHF, rheumatic and non-rheumatic valvular diseases, and coronary artery disease (8). Left atrial (LA) enlargement is strongly correlated with increased incidence of AF, as is mitral valve calcification in patients older than age 60. AF commonly follows cardiac surgery and acute myocardial infarction (MI) and may be self-limiting.

In the CARAF study, 198 (18.2%) of 1086 patients who were entered into the registry during 1991- 1995 developed AF after open-heart surgery, whereas the AF of the remaining 888 was not surgically related. Noncardiac conditions associated with AF include, but are not limited to, hyperthyroidism, diabetes mellitus, alcohol intoxication, use of cholinergic drugs, and pulmonary diseases, as are such factors as exercise, emotional stress, fever, electrocution, hypothermia, trauma, and muscular dystrophy (3)

3.10 COMPLICATIONS OF ATRIAL FIBRILLATION

AF is associated with excess morbidity, primarily Heart Failure and stroke. It is not clear if AF itself results in greater mortality. Patients under the age of 60 who have AF but no apparent heart disease (called lone AF) have been considered a group with a good prognosis.

However, AF appears to be a risk factor for increased mortality in otherwise healthy older individuals and those with coexisting cardiovascular disease, an effect that appears to be more prominent in women. This was illustrated in a report from the Framingham Heart Study in which 621 subjects between the ages of 55 and 94 who developed AF were compared to those who did not. AF almost doubled the risk of death in both men and women .After adjustment for the preexisting cardiovascular diseases with which AF was associated, AF was still associated with a significantly increased risk of death (odds ratio 1.9 for women and 1.5 for men). Both HF and stroke contributed to the excess mortality.(9)

A recently reported retrospective study out of the European Heart failure survey suggests that new-onset AF in the setting of heart failure confirs a 53% increase in in-hospital mortality (23). These results concur with retrospective analyses of CHARM (Candesartan in Heart Failure) and COMET (Carvedilol or Metoprolol European Trial) data which demonstrated adverse outcome for heart failure if AF was present.(24)

MECHANISM OF THROMBOEMBOLISM IN NONVALVULAR AF — The mechanisms leading to an increased risk of stroke, thrombus, and embolism in AF are multiple, complex, and closely interact with each other.

Blood stasis, especially in the left atrial appendage (LAA), along with activation of the hemostatic system in AF, meet two criteria of Virchow's triad for thrombus formation. The last feature of this triad, endocardial injury, may be a factor in thrombus formation, but its role in AF has been less well defined.

In 1991 the Framingham Study showed that a diagnosis of AF made the risk for stroke 3 to 5 times higher and that risk rose from 1.5% during the fifth decade of life to 23.5% by the eighth decade. Rheumatic heart disease patients with AF have a higher incidence of embolism (30%) than those without AF (7%). LA enlargement was characteristic in 90% of AF patients who had a stroke compared with 20% of patients who did not.

In the Framingham Study, AF carried an ominous prognosis followed by rates of significantly higher overall and cardiovascular mortality. AF is associated with a 1.5 greater risk of death for men and 1.9 for women, shortening men's lives by 18 years and women's by 21 years, thereby greatly diminishing women's natural advantage in survival. As noted, AF mortality increases exponentially with advancing age. (9)

Workers have identified AF as an independent predictor of higher cost in the treatment of stroke.

The Danish Investigations of Arrhythmia and Mortality on Dofetilide (DIAMOND) study group reported that in patients who had LV dysfunction and concomitant AF and atrial flutter, mortality rates were increased by 29% compared with patients without these arrhythmias. In a recent study of 3654 patients with class II-IV CHF, outcome was compared in those who had paroxysmal AF, chronic AF, and no AF. Those who had paroxysmal AF and chronic AF had higher incidences of all-cause mortality, but there was no difference between the chronic and paroxysmal groups (10).

AF is thought to be responsible for approximately one-sixth of all ischemic strokes in people over age 60 years.

The incidence of stroke associated with AF increases with age. This was illustrated in a study that evaluated 27,202 men and women, ages 50 to 89, with a hospital diagnosis of AF and without a prior diagnosis of stroke(11). The stroke rate (percent per patient per year) was:

1.3 in those aged 50 to 59 years
2.2 in those aged 60 to 69 years
4.2 for those aged 70 to 79 years
5.1 for those aged 80 to 89 years

Compared with the general population, AF increased the risk of stroke in men (relative risk 2.4) and women (relative risk 3.0). (12)

In addition to causing clinical stroke with major deficits, AF is also associated with silent cerebral infarctions and transient ischemic attacks (TIAs). The frequency of silent cerebral infarction was evaluated in a report of 516 patients with non-rheumatic AF in the Veteran's Affairs Stroke prevention in Atrial Fibrillation Trial (SPINAF) trial; CT scanning was performed initially and, in the absence of neurologic symptoms, at the end of follow-up. One or more silent cerebral infarctions were seen at presentation in 15 percent; the estimated rate of new silent cerebral infarcts was about 1.3 percent per year at up to three years follow-up.

3.11 TREATMENT OF ATRIAL FIBRILLATION

Acute Management of Atrial Fibrillation: Restoration and Maintenance of Sinus Rhythm

The two components of acute management of patients with AF, in addition to prophylaxis of thromboembolism, include control of ventricular rate and conversion to sinus rhythm. Each of these components may come into play depending on clinical circumstances.

The approach to the patient with atrial fibrillation is based on four considerations, in no particular order:
to seek a reversible cause of the condition,
to control the rate, and
to introduce measures to reduce the risk of stroke.
Finally, consideration should be given to cardioverting and maintaining the patient in sinus rhythm.
Rate control, particularly in the elderly — is important and often the initial treatment approach. However, it is common experience that when atrial fibrillation develops in patients, particularly those who are young and active, there is a reduction in the quality of life, which improves with both rate control and restoration of sinus rhythm. It is believed that a physiologic rhythm and a physiologic rate have additive benefit.

Rate Control
The traditional first step in acute treatment of patients with symptomatic AF who have a rapid ventricular response is to slow the ventricular rate. Acute rate control is usually achieved with drugs, whereas long-term rate control can be achieved with a combination of drugs and other non-pharmacological measures.

Rhythm control

In the management of atrial fibrillation, two approaches have been used to improve the treatment for maintaining sinus rhythm. The multi- mechanism approach, which targets several different electro- physiological mechanisms simultaneously, has proved to be effective with amiodarone. An alternative strategy is the single-mechanism approach. Such efforts have involved atrial-selective ion-channel blockers, gap-junction facilitators, and stretch activated channel blockers as examples. However, such approaches presume a clearer understanding of the actual electrophysiological mechanism of atrial fibrillation than is currently available.

Vaughan-Williams Class III drugs, such as sotalol and amiodorone, may be more effective in preventing recurrence than in converting AF to sinus rhythm, but a high incidence of cardiac and noncardiac side effects frequently demands discontinuation of therapy. Amiodarone has been found to be effective in 53% to 79% of patients over 15 to 22 months of average follow-up however the incidence of side effects is and severe enough to warrant drug withdrawal in 9% of patients. The incidence of side effects is lower when the dosage is <200 mg/d; this dosage level may be better tolerated in patients who have LV dysfunction or heart failure.

Flecainide and propafenone are associated with an increased risk of life-threatening ventricular arrhythmias and are contraindicated in patients with coronary artery disease (approximately 30% of patients with atrial fibrillation) and in those with heart failure or significant left ventricular hypertrophy. Sotalol and dofetilide need to be initiated in the hospital because of the risk of QT prolongation and torsades de pointes.

Amiodarone, which is not FDA-approved for use in atrial fibrillation, does not have the proarrhythmic effects of the other agents but can adversely affect the thyroid, lungs, kidneys, liver, skin, and nervous system, among other effects. In the Atrial Fibrillation Follow-up Investigation of Rhythm Management study (AFFIRM), there was a slightly increased incidence of pulmonary toxicity in patients with preexisting pulmonary disease, but mortality from pulmonary causes and overall mortality were not higher among these patients than among those without preexisting pulmonary disease.

Drug treatment in patients with AF who have no underlying structural heart disease should be guided by 3 considerations:

Tolerability
ease of administration
and fewest side effects.

The motivation to restore and maintain sinus rhythm is not to obviate the necessity of anticoagulation therapy but to improve the quality of life, as shown in the Sotalol–Amiodarone Atrial Fibrillation Efficacy Trial (SAFE-T). (13)

But the quality-of-life analysis of the (AFFIRM) trial showed no difference between patients in whom sinus rhythm was maintained and those in whom atrial fibrillation persisted.

As regards the lack of a quality-of-life benefit in the AFFIRM trial. This pivotal atrial-fibrillation study was not double-blinded, and its exercise component was the 6-minute walk test. However, recent data have shown that in such patients sustained sinus rhythm improves the quality of life. In SAFE-T, a double-blinded, placebo-contro lled trial, there were significant improvements in treadmill exercise in patients in sinus rhythm. SAFE-T confirmed the outcome in many smaller trials, which also showed improvements in the

quality of life for patients with conversion from atrial fibrillation to sinus rhythm. The available data emphasize the need to further characterize those patients in atrial fibrillation for whom it is appropriate to restore and maintain sinus rhythm and those for whom atrial fibrillation with rate control is the therapeutic strategy of choice.

However, the AFFIRM and RACE (*Effect of rate or rhythm control on quality of life in persistent atrial fibrillation. Results from the Rate Control versus Electrical Cardioversion study.*) trials described below demonstrated that embolic events occurred with equal frequency regardless of whether a rate control or rhythm control strategy was pursued; furthermore, most embolic events (113 of 157 ischemic strokes in AFFIRM and 29 of 35 embolic events in RACE) occurred after warfarin had been stopped or when the International Normalized Ratio (INR) was sub-therapeutic . These findings indicate that high-risk patients in whom a rhythm control strategy is pursued still require chronic warfarin anticoagulation, even if it seems that sinus rhythm is maintained. (14, 15)

The guidelines of the American College of Cardiology, the American Heart Association, and the European Society of Cardiology recommend Amiodarone as a first-line agent for atrial fibrillation in patients with heart failure but reserving amiodarone as an alternative agent for most patients with atrial fibrillation, the exceptions being those who have clinical heart failure or hypertension with substantial left ventricular hypertrophy. For patients at very high risk for recurrence of atrial fibrillation (e.g., those with severe mitral regurgitation), amiodarone may be the best choice of a first-line agent, given the low likelihood that treatment with other antiarrhythmic agents will be successful. (Class I recommendations)

Dronederone, a new anti-arrhythmic drug Pharmacologically related to Amiodarone but developed to reduce it's risk of side effects may offer promise. As proferred in European Trial in Atrial Fibrillation or Flutter Patients Receiving Dronedarone for the Maintenance of Sinus Rhythm (EURIDIS) and American– Australian–African Trial with Dronedarone in Atrial Fibrillation or Flutter Patients for the Maintenance of Sinus Rhythm (ADONIS) It has however been noted to confer excess Mortality in patients with Moderate to severe heart failure (classes II-III) as noted in the the Antiarrhythmic Trial with Dronedarone in Moderate to Severe Congestive Heart Failure Evaluating Morbidity Decrease (ANDROMEDA), which was consequently discontinued early.(16)

Electrical Atrial Defibrillation

External defibrillation is safe and highly effective but underutilized because of apprehension about using anesthesia and other concerns. No antiarrhythmic drug therapy equals its success rate.

Prophylactic atrial pacing.
Several retrospective studies have shown that atrial pacing may decrease the frequency of recurrence in patients with AF who have sick sinus syndrome. In many of these patients, sinus tachycardia has preceded the onset of AF and, in patients who have paroxysmal AF, there is evidence of intra-atrial conduction delay. Prospective studies have subsequently reported that the incidence of AF is lower for patients treated by atrial pacing than for those treated by ventricular pacing. However, many patients with AF may lack any established indication, such as sick sinus syndrome, for pacemaker implantation.

Small-scale studies have reported longer arrhythmia-free intervals after dual-site or biatrial pacing. Both dual-site RA and biatrial pacing are thought to cause resynchronization of atrial depolarization.

Atrial surgery
Modifications still used to maintain sinus rhythm, the current procedure, known as Maze 3, involves excision of the left and right atrial appendages, isolation of the pulmonary veins, and creation of several additional atrial incisions to interrupt intra-atrial reentry and yet allow normal conduction.

Radio-frequency ablation
Pulmonary-vein ablation is successful in selected patients but is unlikely to satisfy the needs of the millions of patients with atrial fibrillation. A recently published study comparing AV nodal ablation with Pulmonary vein ablation demonstrated greater retardation of worsening of AF from paroxysmal and intermittent to Chronic, improvement in systolic function, six minute walking distance and freedom from AF in patients undergoing PVI in contrast to those undergoing AV nodal ablation (26).

However a worldwide survey of the outcomes of 8745 ablation procedures (27) demonstrated a 52% success rate (ranging from 14.5% to 76.5% among centers), with an additional 23.9% of patients becoming asymptomatic with addition of an antiarrhythmic medication. In 27.3% of patients, more than one procedure was required to attain these results. There was at least one major complication in 6% of patients. Results of ablation therapy are widely variable, due in part to differences in technique, follow-up, definitions of success, use of antiarrhythmic therapy, and in experience and technical proficiency.

This procedure may be worthwhile in patients with concomitant heart failure

3.12 PRIMARY AND SECONDARY PREVENTION- ANTITHROMBOTIC TREATMENT
Because the incidence of stroke increases with advancing age, stroke prevention is a paramount concern in treating patients who have AF. Fortunately, recent trials are shedding light on such important questions as the role of anticoagulation, most effective warfarin (Coumadin) dose, bleeding complications, risk factors, secondary prophylaxis, and therapy with aspirin.

RISK STRATIFICATION — The absolute embolic risk varies among patients. As a result, an estimation of risk stratification is essential for making decisions about treatment in order to maximize benefit and minimize bleeding; warfarin reduces stroke risk by about two to three times with respect to aspirin, but increases the major bleeding rate by about 1.5 times . Risk stratification in patients with AF can be performed using both clinical and echocardiographic parameters.

Valvular heart disease is a high risk for thromboembolism in AF, these patients need anticoagulation
There are different models based on randomized Clinical trials or on data from community cohorts. These agree on the following high risk features for non valvular AF:
A prior embolic event
Hypertension

14

Older age

Other features were regarded as high risk in some, but not all, of the models:
Left ventricular dysfunction or HF — All of the models except that from the Framingham Heart Study

Diabetes — All of the models except SPAF
Coronary artery disease — The ACC/AHA/ESC guidelines
Thyrotoxicosis — The ACC/AHA/ESC guidelines
Female gender — The Framingham Study and,
for women over the age of 75 years-Stroke Prevention in AF (SPAF) and the ACC/AHA/ESC guidelines

The CHADS2 score, which was based upon independent clinical predictors from SPAF and AFI and then tested and validated. This score estimates the risk of stroke, which is defined as focal neurologic signs or symptoms that persist for more than 24 hours and that cannot be explained by hemorrhage, trauma, or other factors, or peripheral embolization, which is much less common. Transient ischemic attacks are not included. All differences between warfarin and no warfarin groups are statistically significant except for a trend with a CHADS2 score of 0. Patients are considered to be at low risk with a score of 0, at intermediate risk with a score of 1 or 2, and at high risk with a score 3. (29)

The CHADS2 score (scheme (an acronym for Congestive heart failure, Hypertension, Age >75, Diabetes mellitus, and prior Stroke or transient ischemic attack) is recommended for the estimation of the risk of ischemic stroke or peripheral embolization; the latter accounts for approximately 6 percent of events.

Patients with a CHADS2 score of 0 are at low risk (0.5 percent per year in the absence of warfarin) and can be managed with aspirin.
Patients with a CHADS2 score 3 are at high risk (5.3 to 6.9 percent per year) and should, in the absence of a contraindication, be treated with warfarin.
Patients with a CHADS2 score of 1 or 2 are at intermediate risk (1.5 to 2.5 percent per year).
One exception is that most experts would consider patients with a prior ischemic stroke, transient ischemic attack, or systemic embolic event to be at high risk even if they have no other risk factors and therefore a CHADS2 score of 2. Furthermore, the great majority of these patients have some other risk factor and a CHADS2 score of at least 3.

Warfarin, the most widely used oral anticoagulant ,is a vitamin K antagonist that interferes with the cyclic interconversion of vitamin K and its 2,3 epoxide (vitamin K epoxide). Vitamin K is a necessary cofactor for the Posttranslational carboxylation of glutamate residues to carboxyglutamates on the N-terminal regions of vitamin K-dependent proteins. Warfarin has a highly predictable onset and duration of action and excellent bioavailability. Close monitoring of dosage and hemostatic response is critical because the dose response varies between patients, depending on absorption rate or on metabolic clearance of the drug.
Concomitant drug use can reduce absorption of warfarin from the intestine or alter its metabolic clearance. Any synthesis or inhibition of vitamin K-dependent coagulation factors, increase of metabolic clearance of vitamin K--dependent coagulation factors, or

interference of other pathways of hemostasis can also affect warfarin's pharmacodynamics . In some cases, the mechanism of warfarin influence is unknown.

Embolic events occurring during adequate anticoagulation are more likely in patients with dense spontaneous echo contrast and low left atrial appendage velocity . In addition, the International Normalised Ratio(INR) is often subtherapeutic, even with careful monitoring, and subtherapeutic values are associated with increased embolic risk . Warfarin was more effective in women than in men (84 and 60 percent risk reduction, respectively), and was beneficial in all age groups, including those over the age of 75 years. In addition, warfarin provided benefit even in patients who developed a stroke while taking warfarin; the death rate was reduced by 33 percent compared with those who had a stroke and were not taking warfarin.

Clinical trials showed the highest risk reduction with warfarin treatment (86 percent in Boston Area Anticoagulation in AF (BAATAF), 79 percent in SPINAF, with 95 percent confidence intervals of 0.51 to 0.96 and 0.52 to 0.90, respectively). (17, 18)

 Aspirin — Several trials have evaluated the role of aspirin for the prevention of thromboembolism in AF with conflicting results . In the (Atrial Fibrillation, Aspirin and Anticoagulation study) AFASAK trial, aspirin (75 mg/day) was associated with a nonsignificant 18 percent reduction in stroke. In contrast, the SPAF-I study, which used a higher dose of aspirin (325 mg/day), found a statistically significant 44 percent reduction in stroke. However, the benefit of aspirin was mainly in reducing the rate of minor strokes, which accounted for 50 percent of all strokes in this study; only 20 to 30 percent of strokes were minor in other trials.
In patients over the age of 75 years, the risk of intracranial hemorrhage with aspirin was much lower than with warfarin; in this age group, the benefit of warfarin in reducing embolic stroke was largely offset by the increased incidence of hemorrhagic stroke.

A meta-analysis of six trials comparing aspirin with placebo found that aspirin reduced the incidence of clinical stroke or TIA by 22 percent (95% CI 2-38 percent); the absolute risk reduction for prevention was 1.5 percent per year.(30) Similar findings, an almost significant 32 percent reduction in stroke risk (odds ratio 0.68, 95% CI 0.46-1.02), were noted in a meta-analysis performed by the American Academy of Family Physicians and the American College of Physicians.
However, as with warfarin, the efficacy of aspirin varies with risk
Although there is modest benefit from aspirin, randomized trials have shown that it is consistently and substantially less effective than warfarin (except in low-risk patients)

 Independent risk factors identified for stroke, determined by multivariate analysis of the pooled data from the Five primary prevention trials, were;

increasing age,
previous stroke or transient ischemic attacks,
history of hypertension, and
diabetes mellitus.

Patients who had:
no risk factors had a thromboembolic risk of 2.5% per year

patients with 1 risk factor had a risk of 7.2% per year
and patients with 2 or 3 risk factors had a risk factor of 17.6% per year.
Those younger than 65 years who had no risk factors (15% of controls) had a 1.0%
annual rate of risk for ischemic stroke.
Those older than 75 years who had 1 or more risk factors had a much higher annual rate
of risk for stroke of 8.1%. There was no difference in risk of stroke for patients with either
chronic or paroxysmal AF.

In addition, in STAF I, two independent high-risk factors were found for later
thromboembolisrn:
Size of left atrium on M-mode echocardiography (>2.5 cm 2)
and moderate to severe LV wall motion abnormality. (19)

The decision to perform acute cardioversion for new-onset AF depends on considerations
unique to each patient: duration of AF, benefits of sinus rhythm, and risks of
cardioversion. Opinions vary as to whether clot formarion occurs sooner than 48 hours (an
argument for delaying cardioversion for anticoagularion). Some believe that AF lasting
<48 hours is minimal cause for delay, provided that the likelihood of spontaneous
conversion is small or that a reversible trigger does not exist.
Furthermore, in some cases, clot formation can occur earlier than 48 hours.
f there are no specific contraindications, anticoagulation is the therapy of choice for
primary and secondary prevention. Randomized trials suggest that adjusted-dose warfarin
s approximately 50% more effective than aspirin.
However, very close INR monitoring is mandatory as the risk of stroke increases with INR
values <2.0, whereas INR values >3.0 result in an increase in intracerebral hemorrhage

Patients with AF who have mitral valve stenosis or regurgitation undoubtedly require
anticoagulation therapy. The incidence of embolism in AF is about 7.7% for patients who
have mitral regurgitation but who are in sinus rhythm, which increases to 22% for a similar
group with AF; and an 8% risk for those who have mitral stenosis and are in sinus rhythm
that increases to 32% risk for a similar group with AF Anticoagulation is recommended for
ll patients whose AF is secondary to rheumatic mitral valve disease except in the
following circumstances where an intense analysis of risk/benefit trade-offs is called for:

regnancy,
gh risk of bleeding from trauma or participation in a contact sport,
stablished concomitant disease, or
ability to control prothrombin times.

Warfarin is recommended for patients who have either paroxysmal or chronic AF and
itral valve disease, but long-term INR values must be maintained at 2.0 to 3.0. In the
se of recurrent systemic embolism despite warfarin therapy, recommended options are
add aspirin (80 to 100 mg daily) or, for patients unable to take aspirin, to either adjust
arfarin dose to prolong the INR to 2.5 to 3.5, to add dipyridamole (400 mgdaily), or to
ld ticlopidine (250 mg twice a day). Anticoagulation is also recommended for patients
ho have either paroxysmal or chronic AF and mitral valve prolapse, but long-term INR
lues must be maintained at 2.0 to 3.0. Patients who have mitral annular calcification
ould also receive long-term warfarin therapy to maintain the INR at 2.0 to 3.0.

17

It has been estimated that approximately one-third of patients with AF (range 14 to 45 percent in different reports) are at low risk for stroke (less than 1 percent per year) and can be treated with aspirin.

CHRONIC THERAPY — Treatment with warfarin or aspirin is indicated in many patients with chronic AF for prevention of stroke and other thromboembolic events. The use of these drugs is based upon clinical features of the patients and risk assessment; recommendations for the choice of therapy have been published by the ACCP and ACC/AHA/ESC- Class I recommendations.

Clinical trials and meta-analyses demonstrate similar results. Among patients with AF at high risk of thromboembolic events, both warfarin and aspirin significantly reduce the incidence of stroke, but warfarin is approximately three times as effective. Overall, adjusted-dose warfarin reduces the risk of stroke by 62 to 69 percent with an absolute annual reduction of 2.7 to 3.1 percent. Thus, treating 100 patients with warfarin will prevent almost three strokes per year. However, the highest risk patients still had a 1.7 percent annual incidence of stroke with warfarin therapy. For comparison, the stroke incidence in among 70 year-olds without AF averages about 1 percent per year.
A recently reported study: Active A reported a further reduction of 6% in the incidence of stroke by the addition of clopidogrel to aspirin for patients with AF considered unsuitable for vitamin K antagonist therapy (32). These positive findings are in contrast to the earlier published ACTIVE W which was stopped early at a mean follow-up of 1.3 years because patients treated with combined antiplatelet therapy had significant increases in both the primary end point of vascular death, MI, systemic embolus or stroke(5.6 versus 3.9 percent per year with oral anticoagulants) and the rate of bleeding (15.4 versus 13.2 percent per year).(33)

3.13 COMPLICATIONS OF THE TREATMENT OF ATRIAL FIBRILLATION

Although atrial defibrillation is generally safe, there are high incidences of skin burns, heart block, and prolonged sinus arrest, as well as some incidence of ventricular proarrhyhmia. Electrical atrial defibrillation can be associated with significant atrial stunning and possible thrombus formation.
However, recent trials have found no difference in safety between electrical and pharmacologic cardioversion.

The most serious side effect of amiodarone is pulmonary toxicity, diagnosed in 6% (33/573) of patients in a retrospective analysis by Dusman et al. Although older patients developed more toxicity than younger ones, no patient whose mean daily dose was <305 mg/d developed pulmonary toxicity. Other dose-related side effects (tremor, nausea, hepatitis, and peripheral neuropathy) all responded to reduction of dose. Non-dose-related side effects are dermatologic reactions and either hypothyroidism or hyperthyroidism.(2)

In a recent review of proarrhythmia during antiarrhythmic drug therapy for supraventricular tachycardia, heart disease was identified in 96% of patients and torsades de pointes was the most commonly identified arrhythmia. Different types of proarrhythmias that may occur as a result of antiarrhythmic drug therapy (2)

Maze procedures ; In addition to perioperative mortality, stroke, and transient ischemic attacks, the most common complications have included fluid retention and atrial arrhythmias. Based on various methods of evaluation, it was estimated that 98% of patients have had RA transport preserved and 86% had LA transport. Of the patients wh have had follow-up for more than 3 months, 29% have undergone permanent pacemake implantation. In a recent report, Kawaguchi et al compared a Maze operation in 51 patients with AF who underwent associated valvular surgery or repair of congenital anomalies with a group of 51 patients matched for underlying disease and procedures b who did not have the.Maze operation.
The Maze group had increases in morbidity but not in mortality. (2)

3.14 COMPLICATIONS OF ANTITHROMBOTIC THERAPY

The major concern with the use of warfarin is the risk of bleeding. Intracranial bleeding is the most serious potential consequence of warfarin therapy.
Both the risk of any bleeding and of major bleeding is higher with adjusted-dose warfarin compared with aspirin. In the individual patient meta-analysis of six prevention trials cite above, the absolute rate increase of major bleeding with warfarin compared with aspirin was 0.9 events per 100 patient-years (2.2 versus 1.3 events per 100 patient-years) (28). Major bleeding includes intracranial bleeds and other bleeds that require hospitalization, transfusion, or surgery. The risk of bleeding rises dramatically at an INR above 4.5 to 5.0 The increased risk of bleeding is particularly relevant to the elderly in whom frailty, poor mobility, forgetfulness or poor compliance, the use of concomitant medications that can result in drug interactions, and frequent falls may supersede the thromboprotective benefits from warfarin.

The bleeding risk in the elderly was evaluated in a review of over 10,000 Medicare recipients (mean age 77 years) who were treated with warfarin for AF (34). At 180 days, the rate of major bleeding was 2.0 percent in patients treated only with warfarin and 2.8 percent in those treated with warfarin plus aspirin. Combination therapy was associated with a three-fold increase in the risk of intracranial hemorrhage (0.3 versus 0.9 percent, odds ratio 2.95). A similar relative increase in risk of intracranial hemorrhage (relative ris 2.4) was noted in a meta-analysis of six randomized trials (35).

Aspirin use is associated with gastric irritation and increased risk of upper gastro-intestin bleeding

3.15 AF IN LOCAL STUDIES

Sheikh et. Al, 2008 (Unpublished data) Studying the prevalence of arrhythmias in ambulatory Chronic obstructive pulmonary disease attending the Chest clinic at Kenyatt National Hospital (KNH), found an AF prevalence of 5% (10 patients) in these sub-group of patients over a six month period (un-published data). (37)

Parmar et.al, 2008 (Unpublished data) Investigating the aetiological factors for in-patien Chronic Heart failure found a prevalence of AF of 15.4% (43 patients) (38)

Prof Ogolla et. al, Medicom 1988 reported a significant prevalence of AF in patients with Rheumatic valvular disease attending KNH cardiology clinic

3.16 AF IN OTHER COUNTRIES

Cheng-Han Lee et al in a retrospective study in Taiwan found a mean annual frequency of diagnosed atrial fibrillation 127 per 100,000 persons and discharge diagnosed in-patients. He also documented Comorbidities of ischemic heart disease, valvular heart disease, hypertension, ischemic stroke, and congestive heart failure (21)

Data from the Birmingham Atrial Fibrillation in the aged trial (BAFTA), Victoria Hurley et al revealed that Hypertension was more commonly diagnosed in older patients with atrial fibrillation than in the general population. The mean systolic blood pressure was slightly lower, but the mean diastolic blood pressure substantially higher in older patients in atrial fibrillation, compared to the general population. (22)

Data from the National Hospital Discharge Survey, which compiles data on discharges from nonfederal hospitals in the United States (US) reveals that Review of discharges of 212 million hospitalizations between 1996 and 2001 identified 2 million admissions with a primary diagnosis of AF in patients aged 15 years and above. The most frequent coexisting conditions in patients admitted with AF were hypertension (37%), heart failure (22.5%), coronary artery disease (17.8%), and diabetes mellitus (15.2%). Stroke was a coexisting medical condition in 1.0% of patients. (23)

Studies of Left Ventricular Dysfunction (SOLVD) Prevention trial revealed a significant baseline prevalence of AF of 4% among enrolled patient with heart failure functional class I and II by New York Heart Association(NYHA) classification. On the other end of the spectrum, patients with NYHA functional class IV symptoms, like those enrolled in the Cooperative North Scandinavian Enalapril Survival Study (CONSENSUS), have a prevalence of AF that approaches 50%.16 Patients who are NYHA functional class II or III have an AF prevalence that is intermediate. (24)

4. JUSTIFICATION OF STUDY

Atrial fibrillation (AF) is growing public health problem that has reached epidemic proportions in western populations. This is directly related to the increasing life-expectancy in these populations and the attendant population curves. In our setting AF is more commonly associated with rheumatic valvular heart disease and with endocrine abnormalities such as thyrotoxicosis.

It is important clinically because affected patients may be at increased risk for mortality, for deterioration in hemodynamics due to increased heart rate, loss of atrioventricular (AV) synchrony, and progressive dysfunction of the left atrium and left ventricle, and for stroke and other embolic events from atrial thrombi.

In addition, AF may cause significant symptoms and impair both functional status and the quality of life. Recently, there has been increasing evidence that AF may contribute to the development of Cognitive dysfunction

The patient population served by KNH has a high prevalence of co-mobidities commonly associated with AF. This suggests that this condition may affect a significant proportion of our patient population
However no data exists exploring the Characteristics of Atrial Fibrillation in the general population in our set-up. A study to describe cases, describe presence and adequacy of physician's response would be very beneficial and contribute to facilitating prompt diagnosis and treatment of these patients

5 OBJECTIVES

5.1 OVERALL OBJECTIVE

To Characterize Atrial Fibrillation as is seen in medical out-patient clinic attendees at the Kenyatta National Hospital

5.2 SPECIFIC OBJECTIVES

1. To describe the demographic characteristics of this patient population.

2. To describe the probable aetiological factors and prevalent comorbidities in the AF patients.

3. To classify AF patients according to clinical type of AF using a modified AHA/ACC/ESC classification criteria.

4. To determine treatment strategies used in the management of AF both for acute cardioversion and for maintenance.

5. To determine anticoagulation therapy used and describe intensity of anti-coagulation.

6. To describe thrombo-embolic complications occurring after the diagnosis of AF and major bleeding episodes consequent to anticoagulation.

7. To document the presence and frequency of ECG tracings in the follow- up of AF patients

5.3 METHODS

5.31 STUDY DESIGN

A Cross-sectional survey

5.32 STUDY SITE

Conducted at the General and Specialist Medical Out patient clinics of the KNH; a large cosmopolitan tertiary care Hospital in Nairobi.

5.33 SAMPLE SIZE

In a pilot study carried out at the KNH General and specialist medical out-patient clinics in one week, twenty-one patients with AF were noted among the attendees.
Average number of Patients seen weekly 1,500, therefore Estimated point prevalence; 1% ie 20/1500

Approximately 10 AF patients expected per week of which half would be re-attendances within the study period.

Expected enrolment of 5 AF patients per week. Within 6 months ,100 patients obtained would provide adequate descriptive data

5.34 SAMPLING TECHNIQUE

Consecutive sampling

5.35 CASE DEFINITION

Patients attending the General or Specialist Medical Out-patient Clinics with a file documented diagnosis of AF either as primary or secondary.
Diagnostic ECG present in records or file mention of diagnostic ECG was considered adequate.
Prevalent and Incident cases of AF included

5.36 INCLUSION CRITERION

The case-definition was solely utilised in patient selection.

5.37 SCREENING AND RECRUITMENT

Daily the Principal Investigator perused all the files of patients booked for Medical out-patient clinics on the designated clinic days and;

1. Identified and isolated all the patient files with file label of AF.

2. The patients had a detailed history, physical examination and ECG performed.

4. The demographic, and clinical characteristics of these patients were captured in a study proforma then transferred to a master database

5.38 DATA COLLECTION

The following Demographic, Clinical and Laboratory Characteristics were documented;

Demographics; Age, sex, marital status, occupation,

Social history; alcohol use, smoking,

Clinical characteristics; primary diagnosis, type of AF, duration of AF, surgical history, resting heart rate within a month of initiation of rate-control therapy

Treatment modalities; Electrical, pharmacological and the temporal sequence of use

Anticoagulation therapy; Drug used, dose utilised

Laboratory values; Latest INR or Kaolin-Cephalin Clotting Time (KCCT) date and value, ECG within a month of initiation of anti-arrhythmic therapy.

These were entered into the study proforma

6 STUDY OUTCOME VARIABLES

6.1 AETIOLOGICAL FACTORS

Chronic Heart failure- A patient with AF were deemed to have CHF as a possible etiological factor if documented in the patient records as a clinical diagnosis, With or without Echocardiographic confirmation

Valvular Heart disease- A patient was deemed to have this as an etiological factor if documented in records to have valvular lesions based on clinical findings and/or Echocardiographic confirmation

Ischaemic Heart disease was deemed to be an etiological factor for AF based on a diagnostic ECG and /or biochemical confirmation

Hyperthyroidism was be considered to be a probable etiological factor based on Laboratory confirmation of elevated Thyroid hormones

Hypertensive Heart disease- was considered to be an etiological factor in the presence of elevated Blood pressure readings or history of treatment for Hypertension and an ECG and /or Echocardiographic diagnosis of hypertensive heart disease

Rare causes included- AF occurring in a patient who has had Cardiac Surgery, alcohol-induced AF (Holiday Heart syndrome), certain drugs i.e theophylline, caffeine, adenosine, digoxin. Tyramine containing foods, Chronic Obstructive Pulmonary Disease (COPD), Congenital heart disease in the documented absence other known etiological factors

Lone AF- patients with AF who lacked aetiological factors on evaluation

Unascertained- Patient records showed inadequate evaluation for etiological factors

6.2 COMORBIDITIES

Relevant co-morbidities as documented in the file were be noted. These were;

Hypertension
Diabetes
Other cardiopulmonary conditions
Non cardiac surgeries

Prevalent or Incident AF was noted

25

6.3 CLASSIFICATION OF AF (modified AHA/ACC/ESC Classification)

A patient with AF was classified as
Paroxysmal AF if the episodes of AF lasted less than seven days

Persistent AF if AF lasted longer than seven days.

Permanent AF if the arrhythmia lasted more than one year and cardioversion either had not been attempted or had failed.

Lone AF if fully evaluated and had no structural heart disease or other evident causation

Unascertained- AF whose episodes had not been described adequately for accurate classification

6.4 TREATMENT OF AF

Treatment was classified according to treatment target as;
Rate control or Rhythm control or None

Rate control – was medication conventionally used to lower the heart rate in the setting of AF. The drugs expected include B blockers (excluding Sotalol) such as atenolol, metoprolol, propanolol, calcium channel blockers such as verapamil, diltiazem and digoxin.

The drug was noted and it's dose. Adequacy of rate control was assessed using;
Resting heart rate documented one month after initiation of treatment
and upon contact whether as a continous variable

Rhythm Control- was medication used to acutely cardiovert to Normal Sinus Rhythm (NSR). Drugs used included Sotalol, Amiodarone, Flecainide, and propafenone.

Drug used and dose was noted, Temporal sequence of drug use was noted
Success of Rhythm control was through;
ECG within a Month of initiation of therapy
and on contact, whether in NSR

6.5 VARIABLES

Resting Heart rate; ≤ 80 was deemed as good control while > 80 was poor control

ECG; NSR was accepted as successful cardioversion or maintenance of the same

Number of ECG tracings in the file was recorded as was number of INR values present or mentioned in patient notes

INR 1.5-3.5 was considered as adequate anticoagulation while < (1.5) will be inadequate and >(3.5) excessive anticoagulation

KCCT 1.5-3 was adequate anticoagulation and values above or beneath this classified similarly

Non-pharmacological Management

Included Electrical Cardioversion, number of times attempted was noted. Radio-frequency ablation and Cardiac surgery and pace-maker insertion

ANTITHROMBOTIC THERAPY

This was noted as per drug used- warfarin, Aspirin or others
Dose used
Adequacy of Monitoring as per Latest INR within six weeks of contact or not and INR value as a continous variable.
KCCT value within 6 weeks of contact as a continuous variable

COMPLICATIONS OF AF AND OF ANTI-THROMBOTIC THERAPY

Relevant outcomes were noted as per;

Stroke
History of Transient Ischemic Attack (TIA)
Other organ embolism
Peripheral embolic episodes
Major bleeding episodes- including Hemorrhagic stroke, haematuria, haemoptysis, haemathrosis
Recent hospitalizations

7 DATA MANAGEMENT AND ANALYSIS

Data cleaning and verification will be done weekly to ensure completeness and validity of the information
Statistical analysis was done using SPSS vs 15 software for Windows

Chi Square was used in the analysis of categorical variables while student t-test was used for analysis of continuous variable for determining statistical significance
Non parametric statistical methods were used when continuous data grossly deviated from normal
Differences were considered significant when P value <0.05

8 ETHICAL CONSIDERATIONS

Approval was obtained from the Department of clinical Medicine and Therapeutics of the University of Nairobi and the Kenyatta National Hospital Ethics and Research Committee before data collection began.

Informed consent was obtained from those participants at the point of Physical examination and ECG documentation. Patients were free to refuse consent and were not discriminated against in any way.

Confidentiality was maintained by excluding patient names from the computerized data entry sheets and storing proformas in a secure location
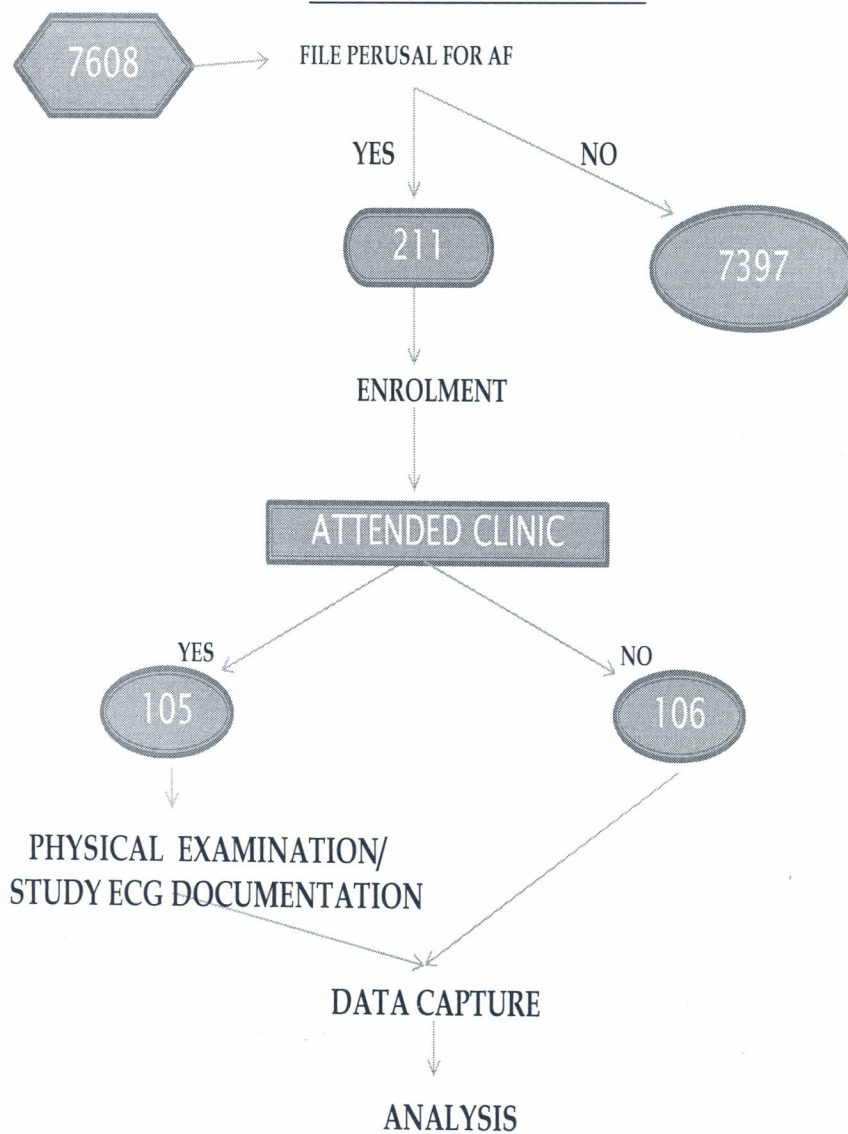
Results of ECG measurements were communicated to the patient and inserted in the patient file.

Knowledge on drug adherence and on the importance of compliance with management strategies of Atrial Fibrillation was imparted and/or reinforced during the encounter.

9 RESULTS

The study was carried out between August 15th 2008 and November 17th 2008. The study flow diagram depicts this
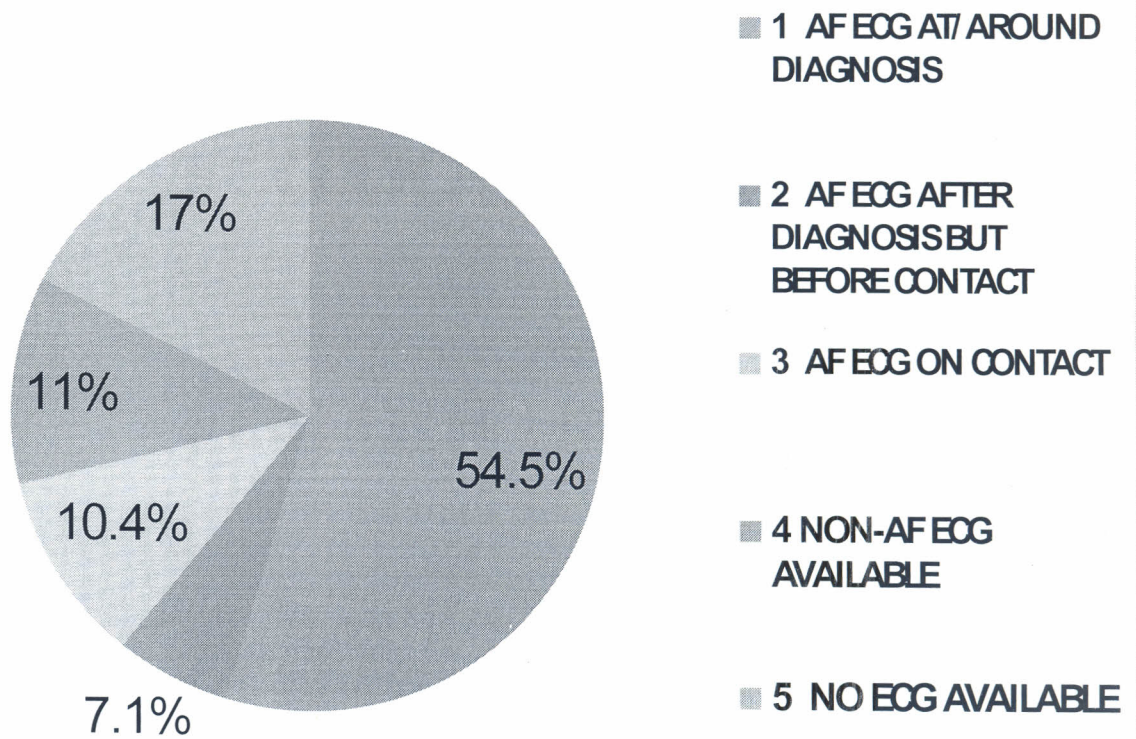
9.1 STUDY FLOW DIAGRAM

7608 → FILE PERUSAL FOR AF

YES   NO

211   7397

ENROLMENT

ATTENDED CLINIC

YES   NO

105   106

PHYSICAL EXAMINATION/
STUDY ECG DOCUMENTATION

DATA CAPTURE

ANALYSIS

Over the three months, We found a period prevalence of 2.77% (211 patients), this is as documented in literature where the prevalence of AF rises with age from a low of 0.5% at 50-59 years to a high of 10% above 80years.

Of these 115 (54.5%) had an ECG tracing done at or around diagnosis confirming AF. The rest had a file label and were either confirmed to have AF some time after commencing treatment or by the study ECG (22 patients)
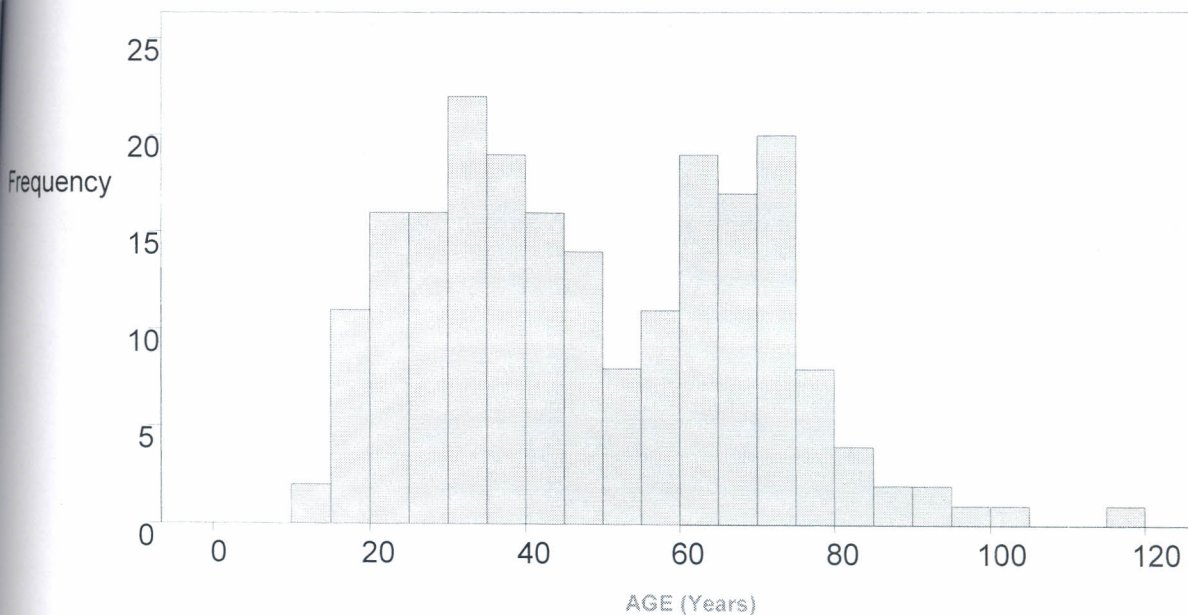
ECG DOCUMENTATION

- 1 AF ECG AT/ AROUND DIAGNOSIS
- 2 AF ECG AFTER DIAGNOSIS BUT BEFORE CONTACT
- 3 AF ECG ON CONTACT
- 4 NON-AF ECG AVAILABLE
- 5 NO ECG AVAILABLE

17%
11%
10.4%
54.5%
7.1%

There were 6 cases of Incident AF recorded during the study period
The patients had AF for an average of 12-23 months by the time of contact

9.2 Demographics

The mean age of AF was 48 years with range of 13 to 120 years. Only 19 (9%) of our patients were aged over 75 with 154 (73.3%) aged 65 years and below. The younger mean age of our patients in contrast to the situation in the west is due to the predominant aetiological factor being valvular heart disease in our set-up unlike the west where non-valvular AF predominates.
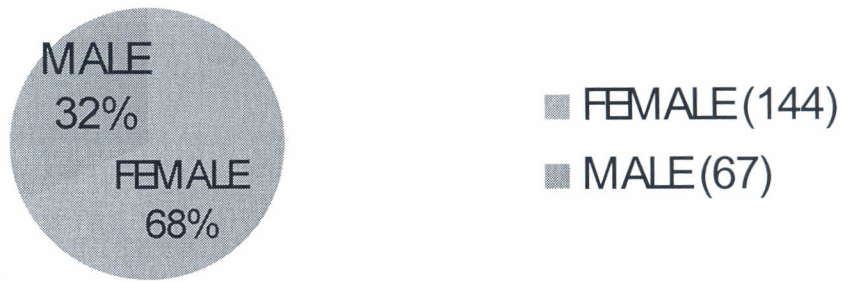
FREQUENCY DISTRIBUTION OF AGE

Bimodal peak of incidence of AF- earlier peak Valvular in aetiology, later peak non-valvular.

The majority of AF patients were women 68%, this may be in keeping with the general patient demographics at this hospital's out-patient clinics. It may also indicate differences in the health seeking behavior between gender with females more likely to attend out-patient clinics than men

GENDER OF AF PATIENTS

MALE
32%

FEMALE
68%

■ FEMALE (144)
■ MALE (67)

58% of our AF patients are in formal occupation while in over 30% their occupation was not documented

OCCUPATION	NUMBER	%
HOUSEWIFE	30	14.2
TRADER	24	11.4
FARMER	32	15.2
OTHERS	36	18
UNKNOWN	73	34.6

(Occupation data for 16 subjects unavailable)

Close to 60% of our patients were married

9.3 CLINICAL CHARACTERISTICS

9.31 SOCIAL FACTORS

Only 6.7% of our patients gave a history of past or present tobacco consumption

8.6% admitted to past or present use of alcohol

About one third of the AF patients engaged in exercise, the majority of whom indicated that it was not regular. This is in keeping with the expected co-morbidites in these patients which would make such activity strenuous. This also suggested that lone AF is not a common finding in our population

9.32 CHRONIC MEDICAL ILLNESSES

Hypertension was present as a cormobidity in 28.9% of our patients this is in keeping with literature from the west where hypertension was the single most prevalent co-morbidity in AF at 37%.

Diabetes mellitus followed in prevalence at 5.7%

Unlike the situation in the West, Coronary artery disease did not account for significant co-morbidity

CHRONIC ILLNESS	NUMBER	%
HYPERTENSION	61	28.9
DIABETES MELLITUS	12	5.7
CAD	1	0
Total	74	

9.34 AETIOLOGICAL FACTORS

Valvular heart disease accounted for close to half of our AF patients 99 (47%). This was expected in our set-up unlike in the west where non-valvular AF causes are eminent. Rheumatic valvular disease was the main cause, also explaining our young population of AF patients.

Hypertensive heart disease was the second commonest aetiological factor accounting for 19.4%

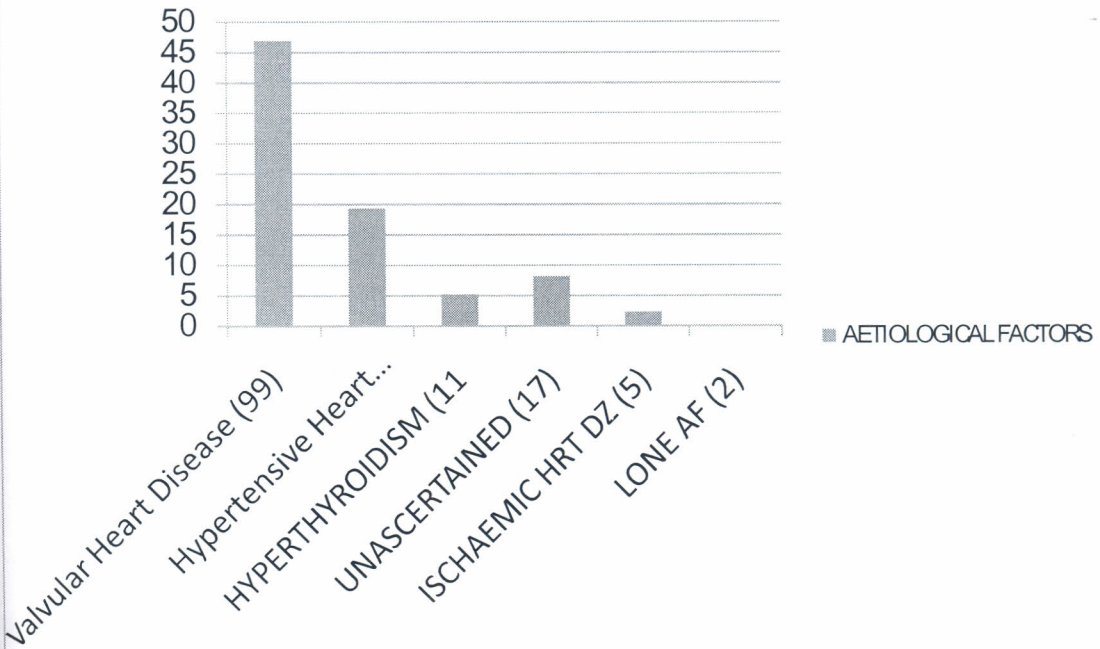Hyperthyroidism followed distantly at 5.2%

5 patients were recorded as having developed AF as a consequence of Ischaemic Heart disease

Significantly, Chronic heart failure was only documented as an aetiological factor for AF in only 3 patients (1.4%) this defers from European statistics that put it at 9% for in-patient chronic heart failure. This may be explained by the predominantly non-valvular nature of AF in this set ups and the advanced age of their AF population

Only two patients had Lone AF

The aetiology of 8.2% of our AF patients had not been documented
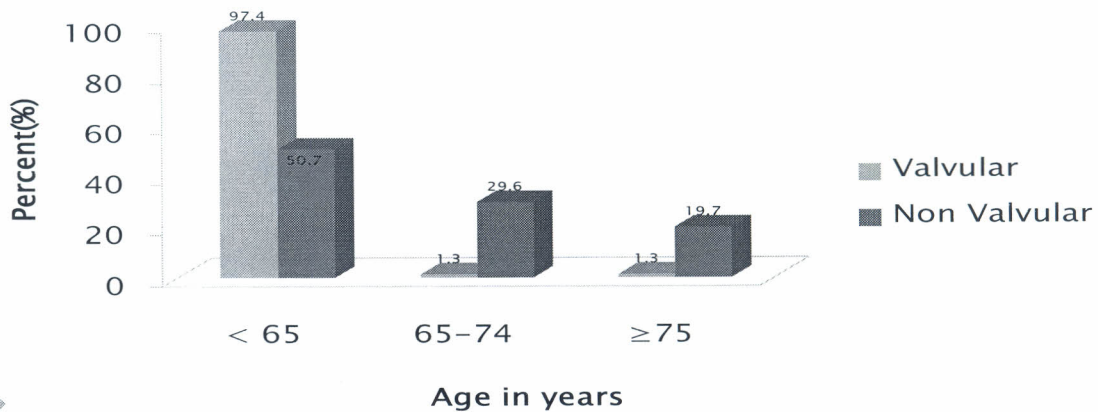
AETIOLOGICAL FACTORS

9.35 VALVULAR AF SUB-ANALYSIS

The results were sub-analysed based on valvular heart disease which was the most common aetiological factor.

Our valvular AF patients were younger patients with 97% of them under 65 years which was significantly different from non-valvular AF p 0.000

DEMOGRAPHICS–VALVULAR VS NON–VALVULAR AF

Bar chart — Percent(%) vs Age in years. Valvular: <65 = 97.4, 65–74 = 1.3, ≥75 = 1.3. Non Valvular: <65 = 50.7, 65–74 = 29.6, ≥75 = 19.7.

AGE<65yrs P 0.000

There were more females than males attending the Medical outpatient Clinics (Mopc) with valvular AF (77.2%) for reasons alluded to above
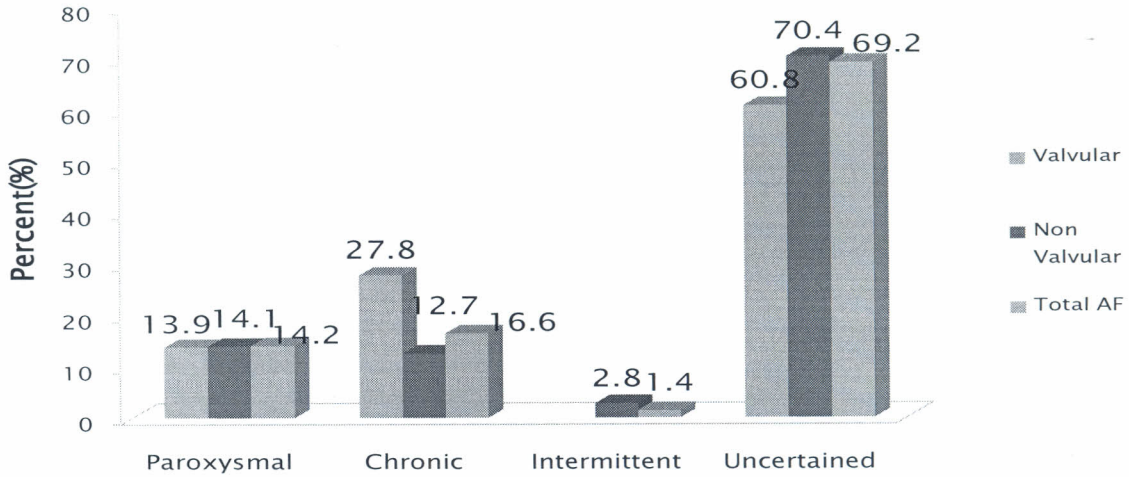Marital status, occupation and level of education was similar to non-valvular AF

With reference to cormobidities only 5.1% of Valvular AF patients had co-existing hypertension in contrast to 53.5% of non-valvular AF patients this was statistically significant with p 0.000 This findings were echoed with hypertensive heart disease, where only 2.5% of valvular AF patients had it in contrast to 42.3% of non-valvular AF p 0.000

CHRONIC MEDICAL ILLNESS	VALVULAR AF		NON-VALVULAR	
	NO.	%	NO.	%
HYPERTENSION	4	5.1	38	53.5
DIABETES	1	1.3	7	9.9
CORONARY ARTERYDISEASE			1	
TOTALS	99		112	

9.36 Class of AF

*With regard to class of AF the majority of our patients had their clinical class un-*documented 69.2%, however 16.6% were classified as chronic AF and 14.2% as paroxysmal. Valvular AF had more patients classified as chronic AF at 27.8% with 13.9% classified as paroxysmal. This would suggest that the AF in the Valvular heart disease patients starts at an earlier age and tends to be persistent. In only 1.4% 0f our patients was the AF documented as intermittent.

35

ACC/AHA/ESC Class of AF

9.37 Treatment of AF

Pharmacological management was adopted for the overwhelming majority of our AF patients at 87.2%. Most of the patients were on a rate-control strategy accounting for 82.5% of our patients. Digoxin was the most commonly prescribed drug at 73.5% followed by carvedilol at 35.5%, atenolol was on-board for 20.9% of the patients. Propanolol and verapamil accounted for less than 3% of the patients in this study.
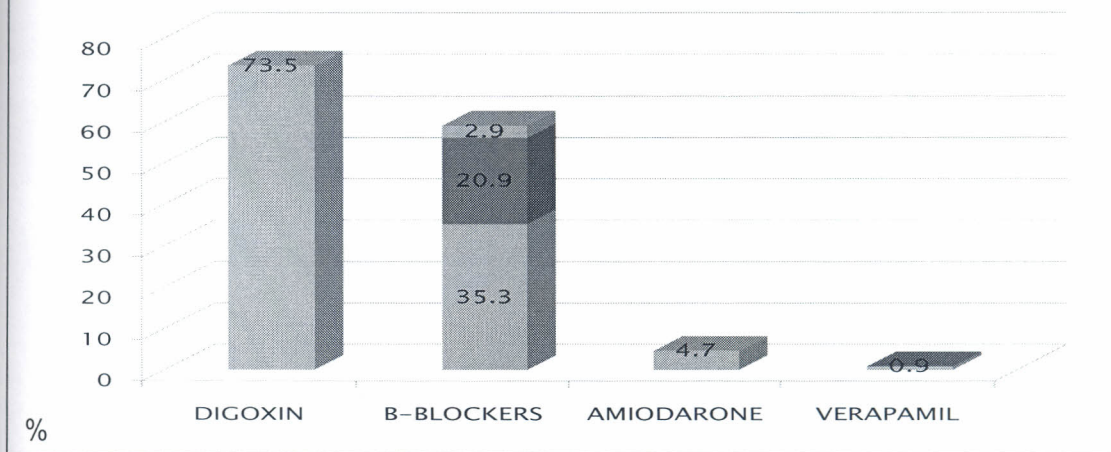
4.7% of the patients were on a rhythm-control strategy with amiodarone

DRUG	NO.	%
DIGOXIN	155	73.5
CARVEDILOL	75	35.5
ATENOLOL	44	20.9
AMIODARONE	10	4.7
PROPANOLOL	6	2.8
VERAPAMIL	2	0.9

TOTAL   211

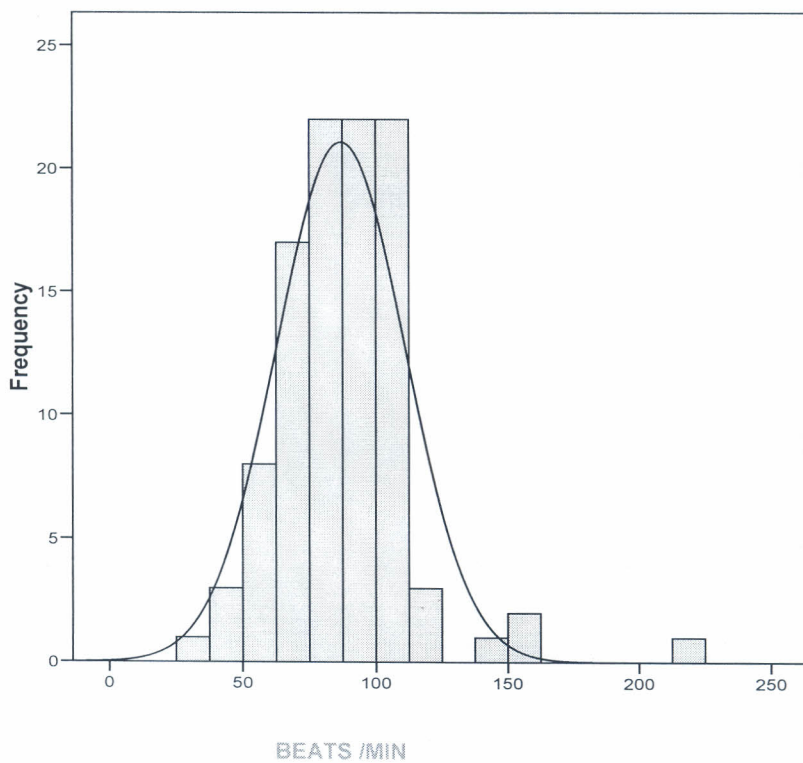(Most patients were on more than one pharmacological agent)
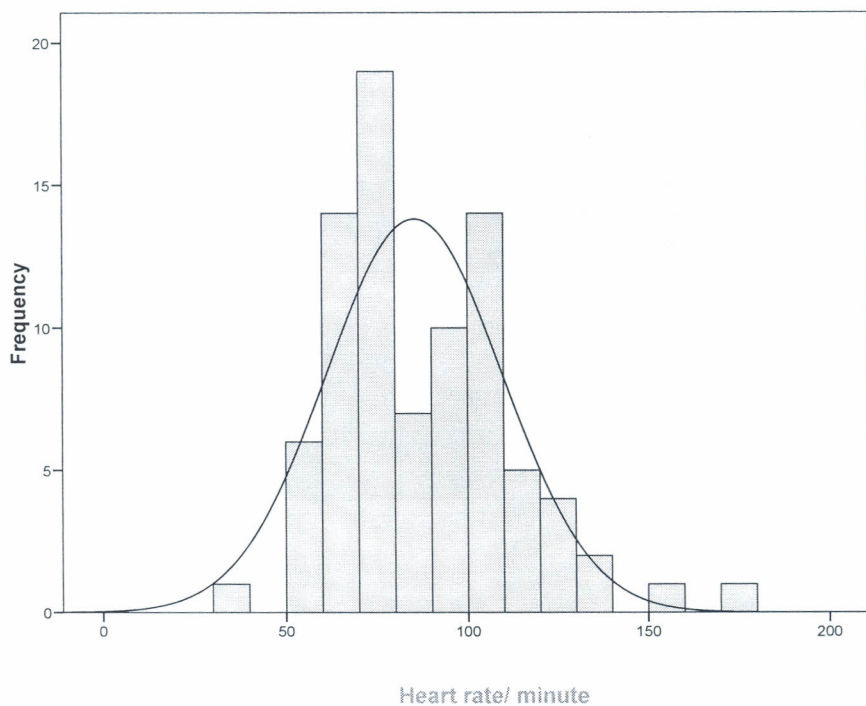
DRUGS USED IN RX

9.38 Effectiveness of therapy

Rate-control was effective in 44 (43%) of the patients on this strategy one month after initiation of therapy and a greater proportion 42 (56.9%) on contact during this study.

RESTING HEART RATE IN ONE MONTH

RESTING HEART RATE ON CONTACT

Heart rate/ minute

9.39 ANTITHROMBOTIC USE

81% of the patients were on some form of anticoagulation with 60% on Warfarin. This proportion was higher for Valvular AF at 90% the remainder were almost all on aspirin The doses of Warfarin used ranged from 2.5mg to 12.5 mg, with most of the patients being on 5mg. This is a higher dose than that recorded in western literature of an average of 3mg daily. It is not clear if genetics could explain this or need for greater intensity of anticoagulation in valvular AF

ANTITHROMBOTIC USE

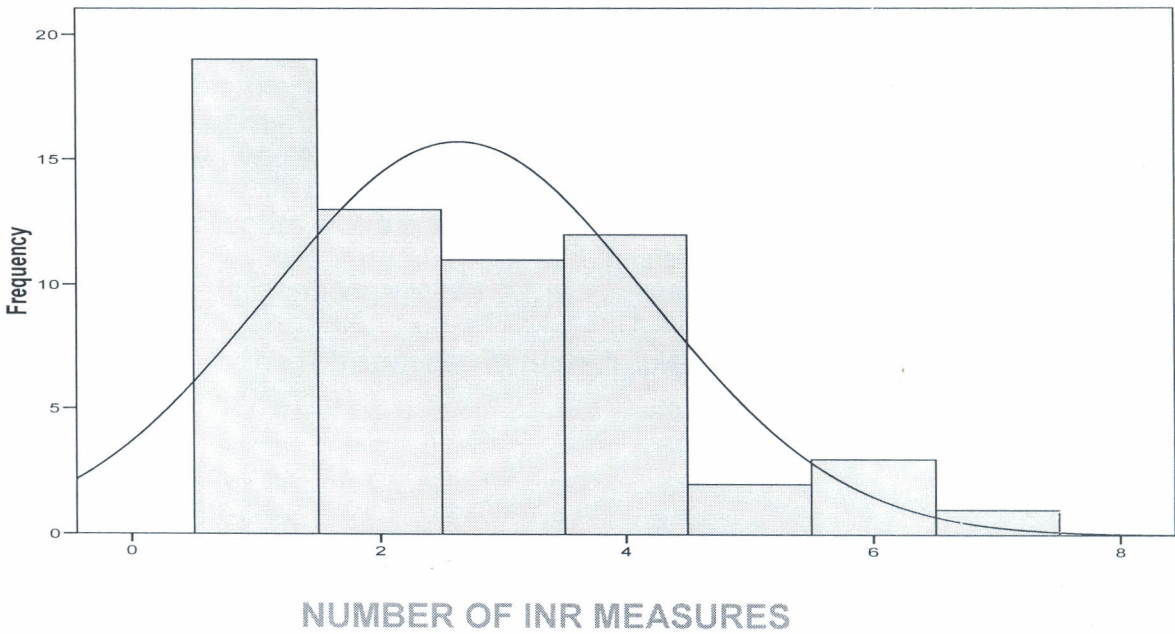## 9.4 INR MONITORING
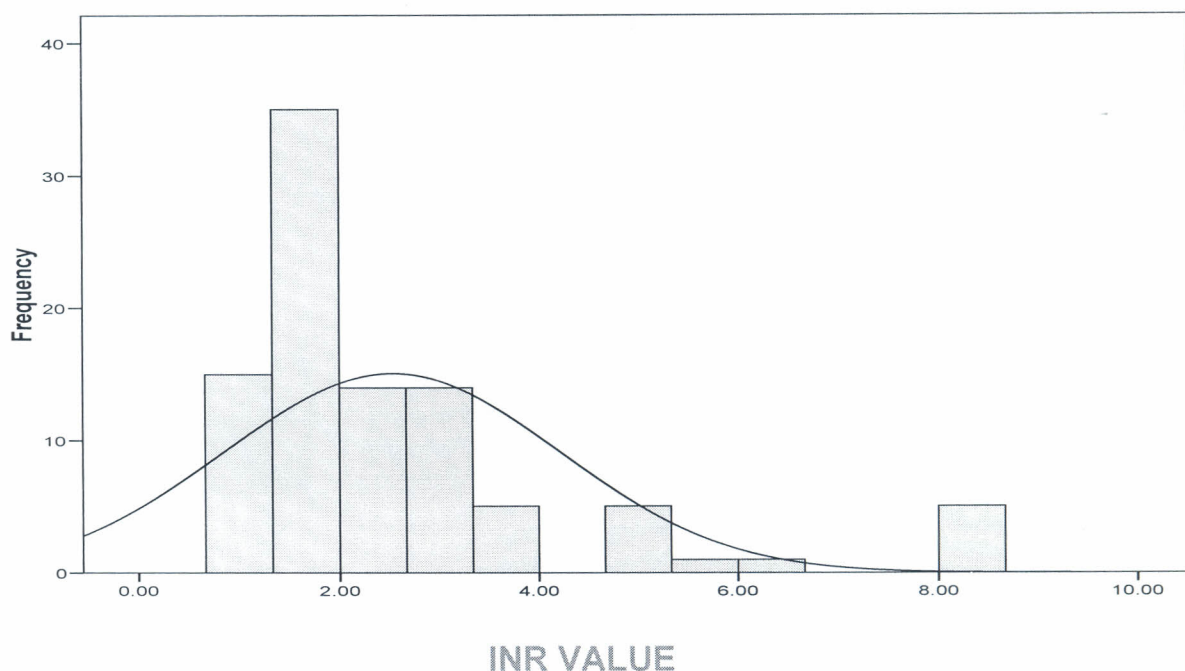
INR monitoring in the preceeding six months was only done two and a half times on average instead of the expected four to six times (4-6 weekly).

FREQUENCY OF INR MONITORING IN 6/12

The majority of our patients had adequate intensity of anticoagulation as measured by INR values 57 (60%), 24% had inadequate anticoagulation while 16% had excessive anticoagulation

39

INTENSITY OF ANTICOAGULATION

9.41 Complications of AF or it's treatment

Development of heart failure was the most commonly reported complication of AF at almost half this population 46.9%. Valvular Af had a higher occurrence of heart failure at 63.3%. This may be attributed to the inexorable worsening of cardiac function in valvular heart disease, only ameliorated by correction of the abnormalities. AF is associated with hemodynamic compromise with a fall in cardiac index in the short term which appears to dissipate as AF persists. This may also contribute to the high incidence of documented heart failure in this population.

AF related hospitalization was the second commonest complication of AF at 14% followed thrombo-embolic episodes at 12%. These were mostly infarctive strokes, whose proportion did not differ among valvular AF as compared to non-valvular AF.

Documented Major bleeding episodes were negligible in this population. This may have been due to under-reporting.

Complications of AF or it's treatment

Bar chart titled "Complications of AF or it's treatment". Y-axis labeled "Percent(%)" ranging from 0 to 70. Categories along the x-axis: ThromboEmbolic Episodes, Heart Failure, Major bleeding episode, AF related hospitalization. Legend: Valvular, Non Valvular, Total AF.

- ThromboEmbolic Episodes: 12.7 (Valvular), 12.7 (Non Valvular), 12 (Total AF)
- Heart Failure: 63.3 (Valvular), 40.8 (Non Valvular), 46.9 (Total AF)
- Major bleeding episode: 2.8 (Valvular), 0.2 (Non Valvular)
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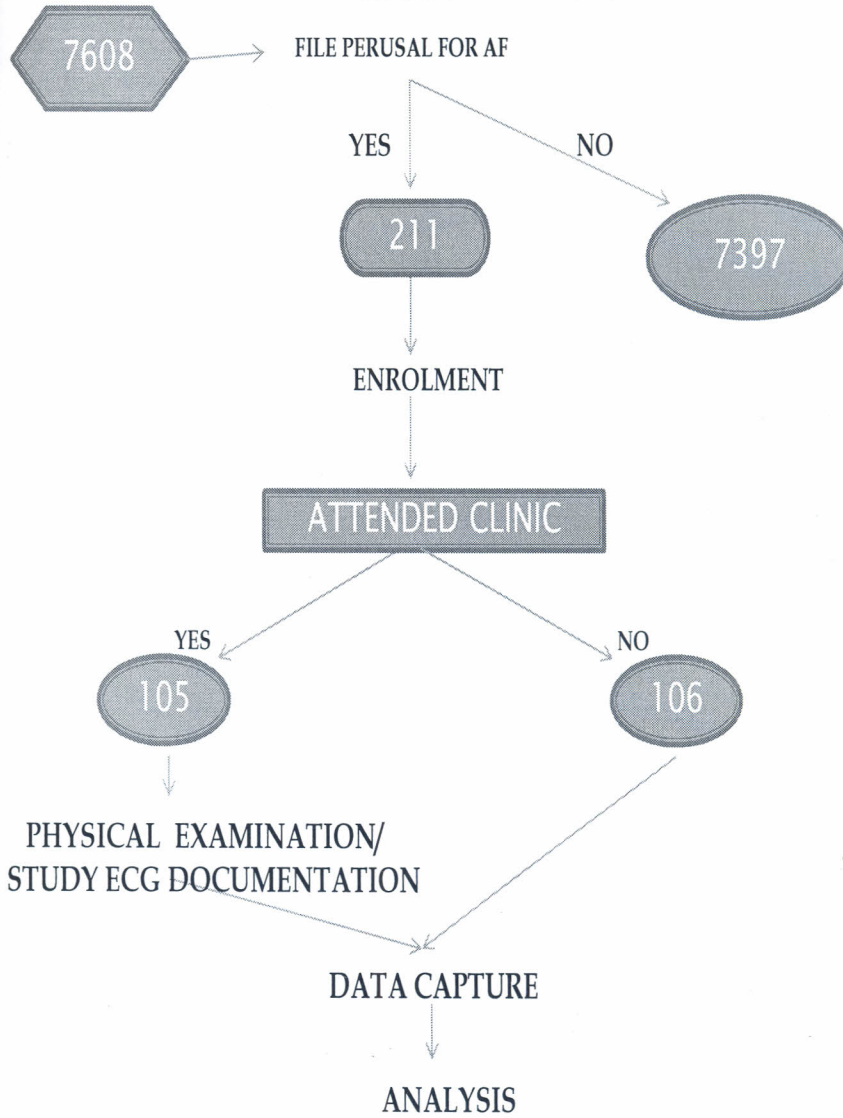
9 RESULTS

The study was carried out between August 15th 2008 and November 17th 2008. The study flow diagram depicts this

9.1 STUDY FLOW DIAGRAM

7608 → FILE PERUSAL FOR AF

YES   NO

211   7397

ENROLMENT

ATTENDED CLINIC

YES   NO

105   106

PHYSICAL EXAMINATION/
STUDY ECG DOCUMENTATION

DATA CAPTURE

ANALYSIS
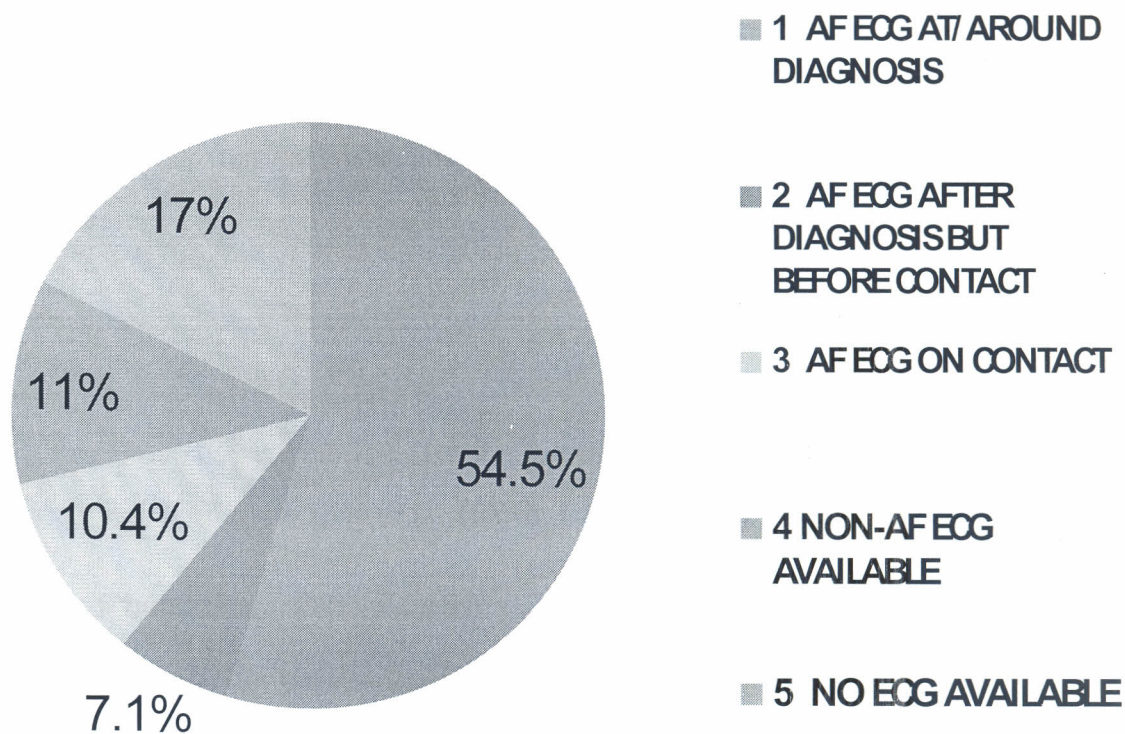
Over the three months, We found a period prevalence of 2.77% (211 patients), this is as documented in literature where the prevalence of AF rises with age from a low of 0.5% at 50-59 years to a high of 10% above 80years.

Of these 115 (54.5%) had an ECG tracing done at or around diagnosis confirming AF. The rest had a file label and were either confirmed to have AF some time after commencing treatment or by the study ECG (22 patients)

ECG DOCUMENTATION

- 1 AF ECG AT/ AROUND DIAGNOSIS
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- 4 NON-AF ECG AVAILABLE
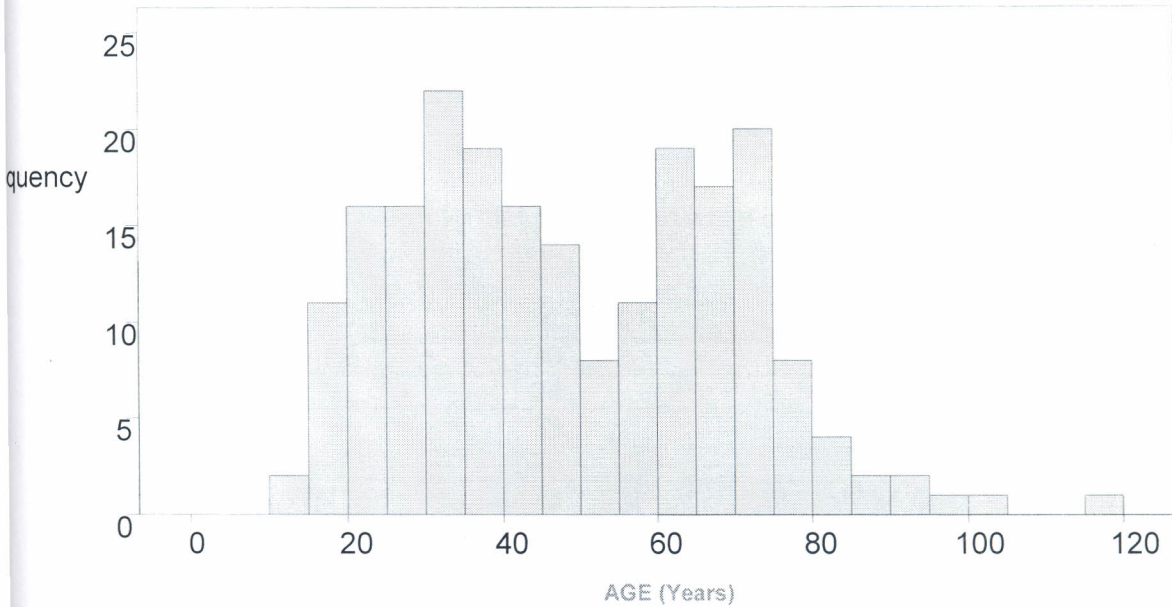- 5 NO ECG AVAILABLE

17%

11%

10.4%

54.5%

7.1%

There were 6 cases of Incident AF recorded during the study period
The patients had AF for an average of 12-23 months by the time of contact

9.2 Demographics

The mean age of AF was 48 years with range of 13 to 120 years. Only 19 (9%) of our patients were aged over 75 with 154 (73.3%) aged 65 years and below. The younger mean age of our patients in contrast to the situation in the west is due to the predominant aetiological factor being valvular heart disease in our set-up unlike the west where non-valvular AF predominates.

FREQUENCY DISTRIBUTION OF AGE

Bimodal peak of incidence of AF- earlier peak Valvular in aetiology, later peak non-valvular.

The majority of AF patients were women 68%, this may be in keeping with the general patient demographics at this hospital's out-patient clinics. It may also indicate differences in the health seeking behavior between gender with females more likely to attend out-patient clinics than men

GENDER OF AF PATIENTS

MALE
32%
FEMALE
68%

- FEMALE (144)
- MALE (67)

58% of our AF patients are in formal occupation while in over 30% their occupation was not documented

OCCUPATION	NUMBER	%
HOUSEWIFE	30	14.2
TRADER	24	11.4
FARMER	32	15.2
OTHERS	36	18
UNKNOWN	73	34.6

(Occupation data for 16 subjects unavailable)

Close to 60% of our patients were married

9.3 CLINICAL CHARACTERISTICS

9.31 SOCIAL FACTORS

Only 6.7% of our patients gave a history of past or present tobacco consumption

8.6% admitted to past or present use of alcohol

About one third of the AF patients engaged in exercise, the majority of whom indicated that it was not regular. This is in keeping with the expected co-morbidites in these patients which would make such activity strenuous. This also suggested that lone AF is not a common finding in our population

9.32 CHRONIC MEDICAL ILLNESSES

Hypertension was present as a cormobidity in 28.9% of our patients this is in keeping with literature from the west where hypertension was the single most prevalent co-morbidity in AF at 37%.

Diabetes mellitus followed in prevalence at 5.7%

Unlike the situation in the West, Coronary artery disease did not account for significant co-morbidity

CHRONIC ILLNESS	NUMBER	%
HYPERTENSION	61	28.9
DIABETES MELLITUS	12	5.7
CAD	1	0
Total	74	

9.34 AETIOLOGICAL FACTORS

Valvular heart disease accounted for close to half of our AF patients 99 (47%). This was expected in our set-up unlike in the west where non-valvular AF causes are eminent. Rheumatic valvular disease was the main cause, also explaining our young population of AF patients.

Hypertensive heart disease was the second commonest aetiological factor accounting for 19.4%

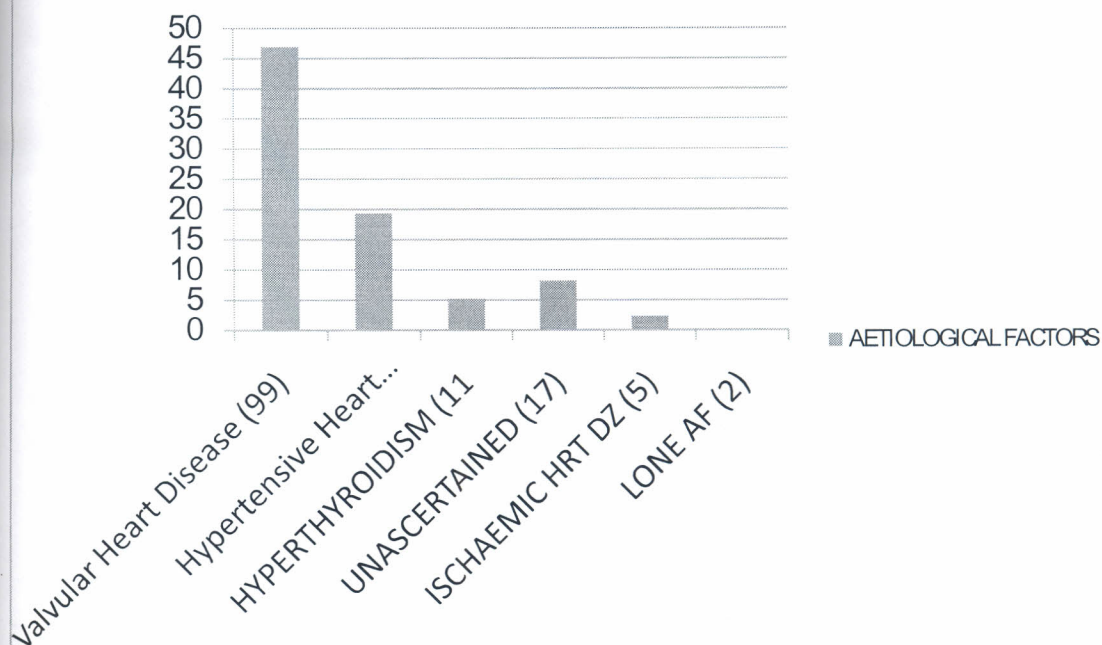Hyperthyroidism followed distantly at 5.2%

5 patients were recorded as having developed AF as a consequence of Ischaemic Heart disease

Significantly, Chronic heart failure was only documented as an aetiological factor for AF in only 3 patients (1.4%) this defers from European statistics that put it at 9% for in-patient chronic heart failure. This may be explained by the predominantly non-valvular nature of AF in this set ups and the advanced age of their AF population

Only two patients had Lone AF

The aetiology of 8.2% of our AF patients had not been documented
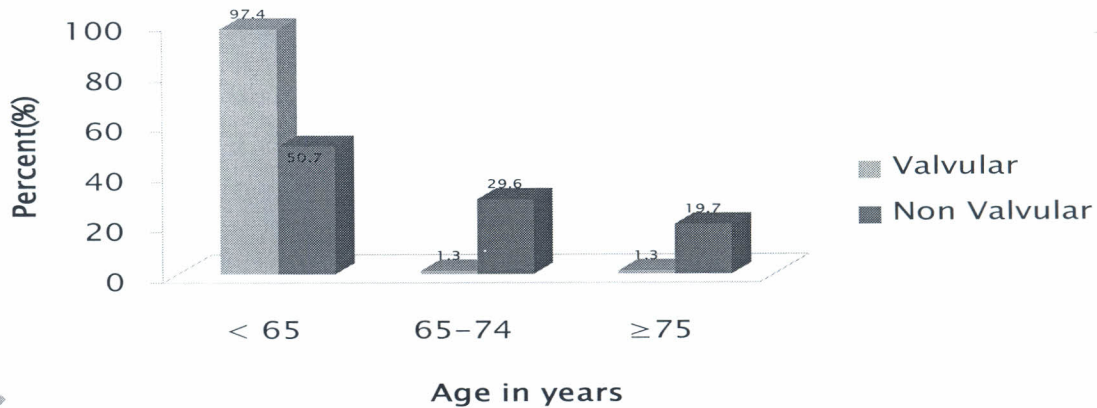
33

AETIOLOGICAL FACTORS

9.35 VALVULAR AF SUB-ANALYSIS

The results were sub-analysed based on valvular heart disease which was the most common aetiological factor.

Our valvular AF patients were younger patients with 97% of them under 65 years which was significantly different from non-valvular AF p 0.000

DEMOGRAPHICS–VALVULAR VS NON–VALVULAR AF

AGE<65yrs P 0.000

There were more females than males attending the Medical outpatient Clinics (Mopc) with valvular AF (77.2%) for reasons alluded to above
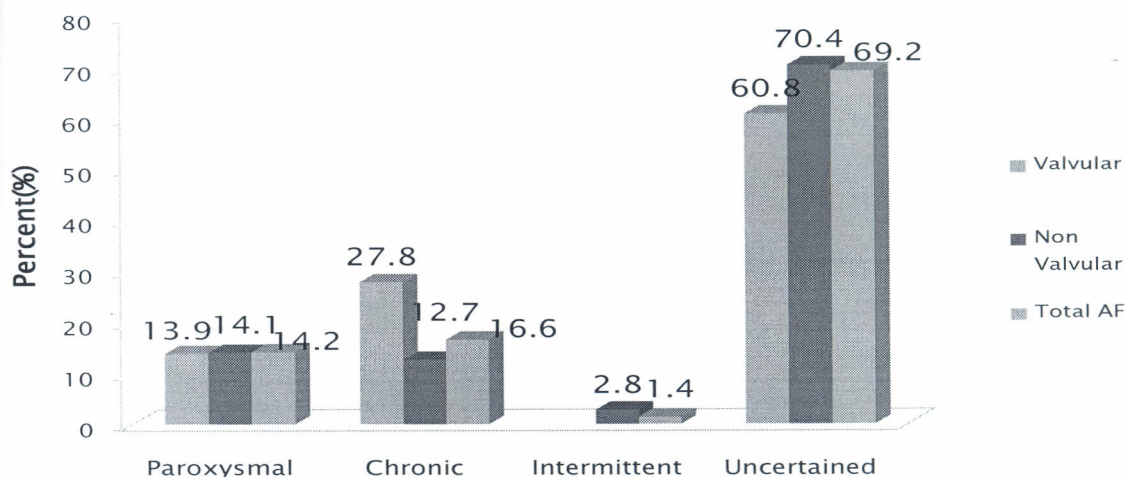Marital status, occupation and level of education was similar to non-valvular AF

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CHRONIC MEDICAL ILLNESS	VALVULAR AF		NON-VALVULAR	
	NO.	%	NO.	%
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TOTALS	99		112	

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With regard to class of AF the majority of our patients had their clinical class un-documented 69.2%, however 16.6% were classified as chronic AF and 14.2% as paroxysmal. Valvular AF had more patients classified as chronic AF at 27.8% with 13.9% classified as paroxysmal. This would suggest that the AF in the Valvular heart disease patients starts at an earlier age and tends to be persistent. In only 1.4% 0f our patients was the AF documented as intermittent.

ACC/AHA/ESC Class of AF

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4.7% of the patients were on a rhythm-control strategy with amiodarone

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CARVEDILOL	75	35.5
ATENOLOL	44	20.9
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PROPANOLOL	6	2.8
VERAPAMIL	2	0.9

TOTAL   211

(Most patients were on more than one pharmacological agent)

DRUGS USED IN RX

Bar chart showing percentages for DIGOXIN 73.5, B-BLOCKERS (35.3, 20.9, 2.9), AMIODARONE 4.7, VERAPAMIL 0.9

9.38 Effectiveness of therapy

Rate-control was effective in 44 (43%) of the patients on this strategy one month after initiation of therapy and a greater proportion 42 (56.9%) on contact during this study.

RESTING HEART RATE IN ONE MONTH

Histogram of Frequency versus BEATS /MIN

RESTING HEART RATE ON CONTACT
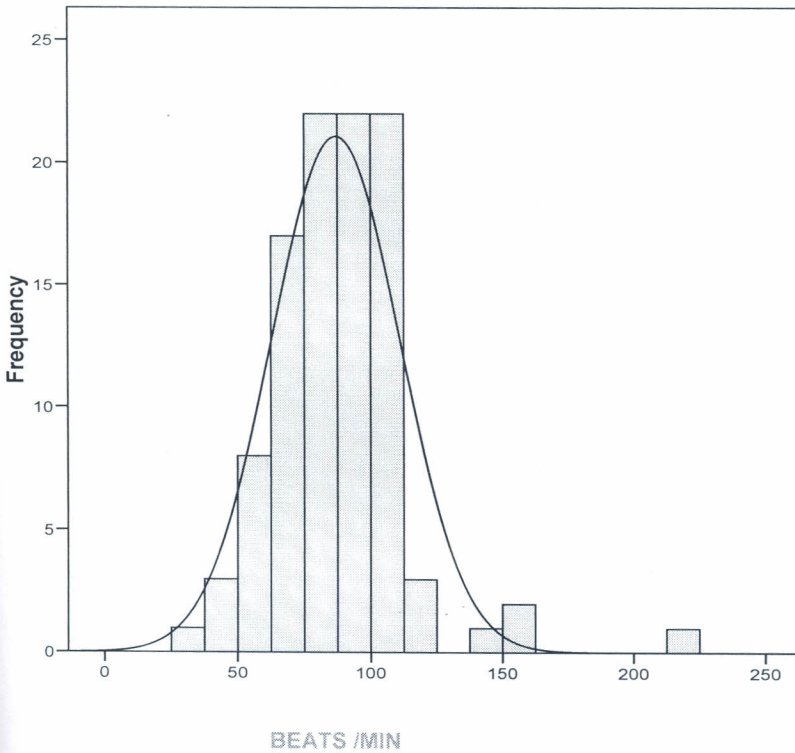

Heart rate/ minute

9.39 ANTITHROMBOTIC USE

81% of the patients were on some form of anticoagulation with 60% on Warfarin. This proportion was higher for Valvular AF at 90% the remainder were almost all on aspirin The doses of Warfarin used ranged from 2.5mg to 12.5 mg, with most of the patients being on 5mg. This is a higher dose than that recorded in western literature of an average of 3mg daily. It is not clear if genetics could explain this or need for greater intensity of anticoagulation in valvular AF

ANTITHROMBOTIC USE

9.4 INR MONITORING

INR monitoring in the preceeding six months was only done two and a half times on average instead of the expected four to six times (4-6 weekly).

FREQUENCY OF INR MONITORING IN 6/12

NUMBER OF INR MEASURES

The majority of our patients had adequate intensity of anticoagulation as measured by INR values 57 (60%), 24% had inadequate anticoagulation while 16% had excessive anticoagulation

INTENSITY OF ANTICOAGULATION

INR VALUE

9.41 Complications of AF or it's treatment

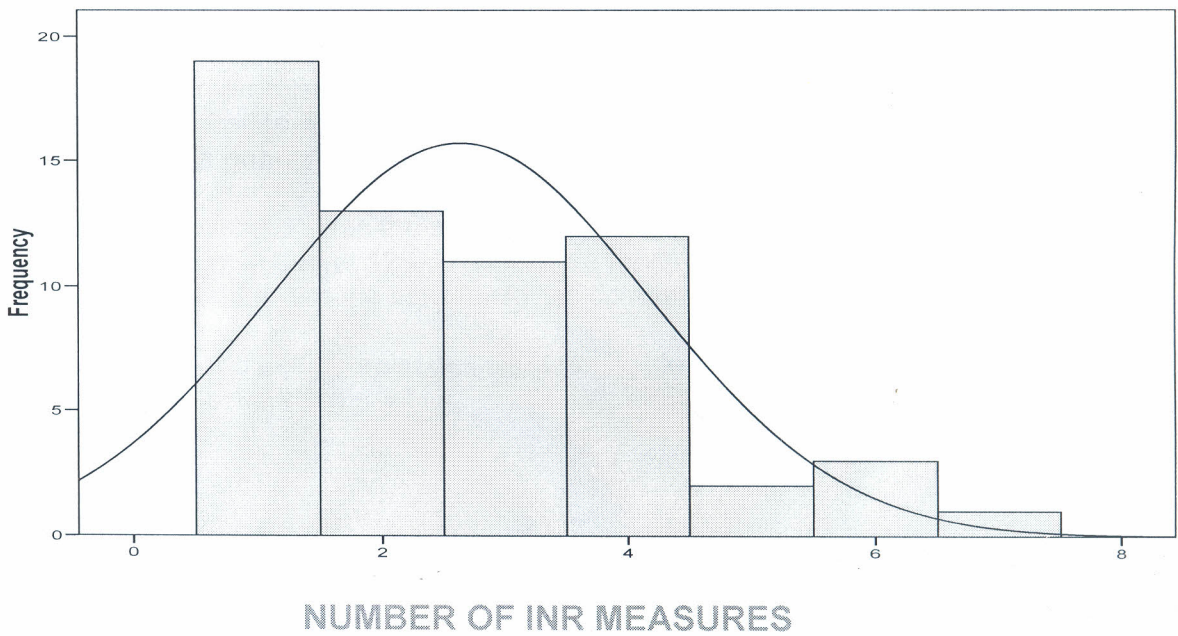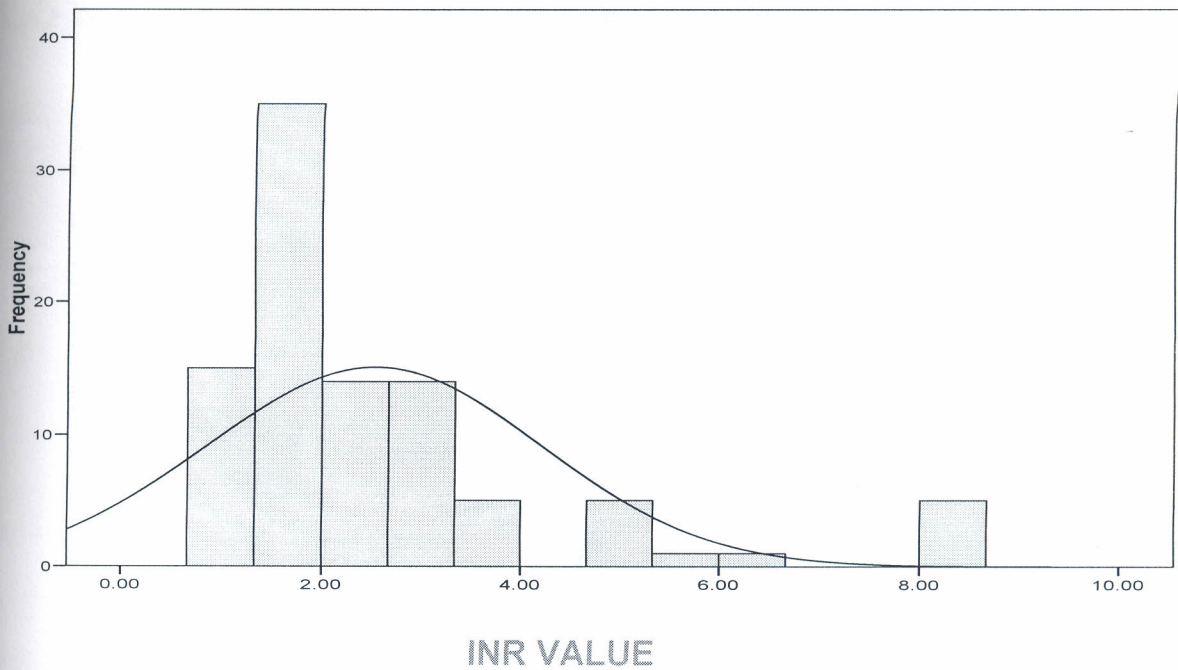Development of heart failure was the most commonly reported complication of AF at almost half this population 46.9%. Valvular Af had a higher occurrence of heart failure at 63.3%. This may be attributed to the inexorable worsening of cardiac function in valvular heart disease, only ameliorated by correction of the abnormalities. AF is associated with hemodynamic compromise with a fall in cardiac index in the short term which appears to dissipate as AF persists. This may also contribute to the high incidence of documented heart failure in this population.

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Documented Major bleeding episodes were negligible in this population. This may have been due to under-reporting.

Complications of AF or it's treatment

Bar chart titled "Complications of AF or it's treatment" showing Percent(%) on the y-axis (0 to 70) for four complication categories, with three series: Valvular, Non Valvular, and Total AF.

- ThromboEmbolic Episodes: 12.7, 12.7, 12
- Heart Failure: 63.3, 40.8, 46.9
- Major bleeding episode: 2.8, 0.2
- AF related hospitalization: 13.9, 12.7, 13.7

Legend: Valvular, Non Valvular, Total AF

9 RESULTS

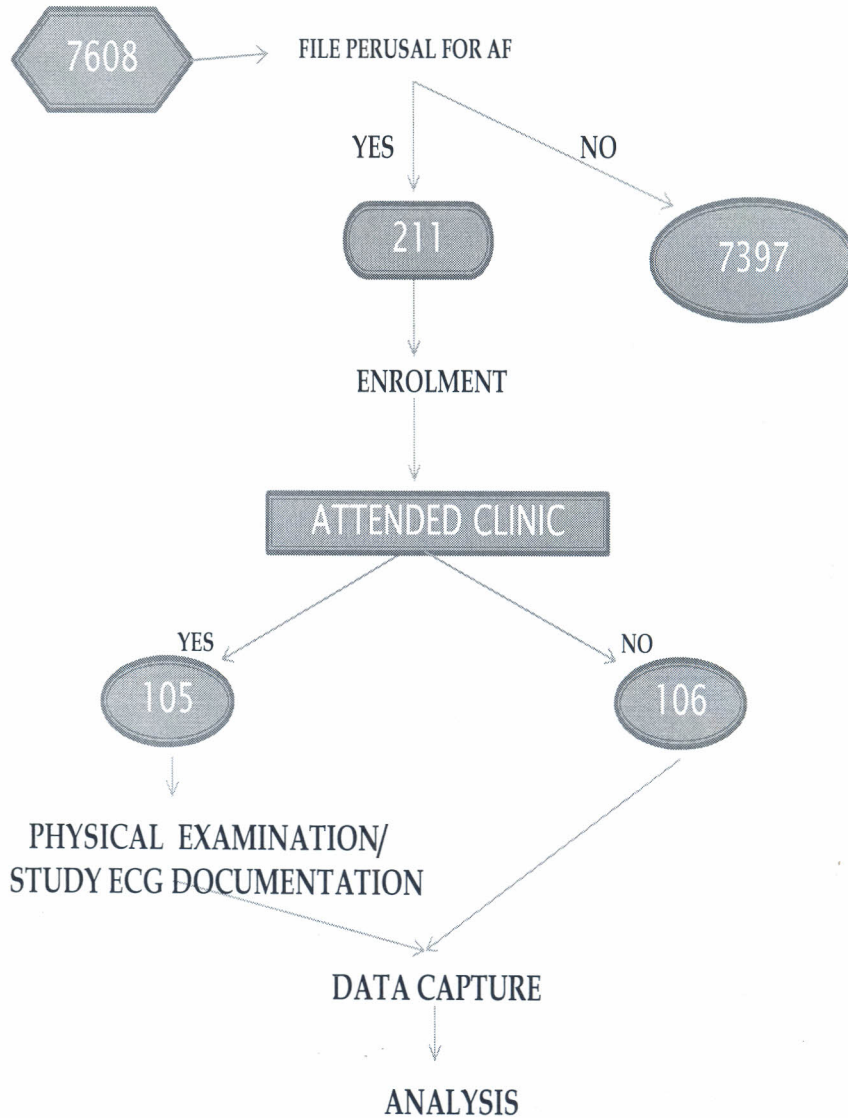The study was carried out between August 15th 2008 and November 17th 2008. The study flow diagram depicts this

9.1 STUDY FLOW DIAGRAM

FILE PERUSAL FOR AF

7608

YES   NO

211   7397

ENROLMENT

ATTENDED CLINIC

YES   NO

105   106

PHYSICAL EXAMINATION/
STUDY ECG DOCUMENTATION

DATA CAPTURE

ANALYSIS

Over the three months, We found a period prevalence of 2.77% (211 patients), this is as documented in literature where the prevalence of AF rises with age from a low of 0.5% at 50-59 years to a high of 10% above 80years.

Of these 115 (54.5%) had an ECG tracing done at or around diagnosis confirming AF. The rest had a file label and were either confirmed to have AF some time after commencing treatment or by the study ECG (22 patients)

ECG DOCUMENTATION

- 1 AF ECG AT/ AROUND DIAGNOSIS
- 2 AF ECG AFTER DIAGNOSIS BUT BEFORE CONTACT
- 3 AF ECG ON CONTACT
- 4 NON-AF ECG AVAILABLE
- 5 NO ECG AVAILABLE

17%
11%
10.4%
7.1%
54.5%

There were 6 cases of Incident AF recorded during the study period
The patients had AF for an average of 12-23 months by the time of contact

9.2 Demographics

The mean age of AF was 48 years with range of 13 to 120 years. Only 19 (9%) of our patients were aged over 75 with 154 (73.3%) aged 65 years and below. The younger mean age of our patients in contrast to the situation in the west is due to the predominant aetiological factor being valvular heart disease in our set-up unlike the west where non-valvular AF predominates.

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Bimodal peak of incidence of AF- earlier peak Valvular in aetiology, later peak non-valvular.

The majority of AF patients were women 68%, this may be in keeping with the general patient demographics at this hospital's out-patient clinics. It may also indicate differences in the health seeking behavior between gender with females more likely to attend out-patient clinics than men

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32%

FEMALE
68%

■ FEMALE (144)

■ MALE (67)

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TRADER	24	11.4
FARMER	32	15.2
OTHERS	36	18
UNKNOWN	73	34.6

(Occupation data for 16 subjects unavailable)

Close to 60% of our patients were married

9.3 CLINICAL CHARACTERISTICS

9.31 SOCIAL FACTORS

Only 6.7% of our patients gave a history of past or present tobacco consumption

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About one third of the AF patients engaged in exercise, the majority of whom indicated that it was not regular. This is in keeping with the expected co-morbidites in these patients which would make such activity strenuous. This also suggested that lone AF is not a common finding in our population

9.32 CHRONIC MEDICAL ILLNESSES

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Diabetes mellitus followed in prevalence at 5.7%

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CHRONIC ILLNESS	NUMBER	%
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Total	74	

9.34 AETIOLOGICAL FACTORS

Valvular heart disease accounted for close to half of our AF patients 99 (47%). This was expected in our set-up unlike in the west where non-valvular AF causes are eminent. Rheumatic valvular disease was the main cause, also explaining our young population of AF patients.

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Only two patients had Lone AF

The aetiology of 8.2% of our AF patients had not been documented

AETIOLOGICAL FACTORS

Bar chart showing aetiological factors: Valvular Heart Disease (99), Hypertensive Heart..., HYPERTHYROIDISM (11, UNASCERTAINED (17), ISCHAEMIC HRT DZ (5), LONE AF (2). Y-axis scale 0–50. Legend: AETIOLOGICAL FACTORS

9.35 VALVULAR AF SUB-ANALYSIS

The results were sub-analysed based on valvular heart disease which was the most common aetiological factor.

Our valvular AF patients were younger patients with 97% of them under 65 years which was significantly different from non-valvular AF p 0.000

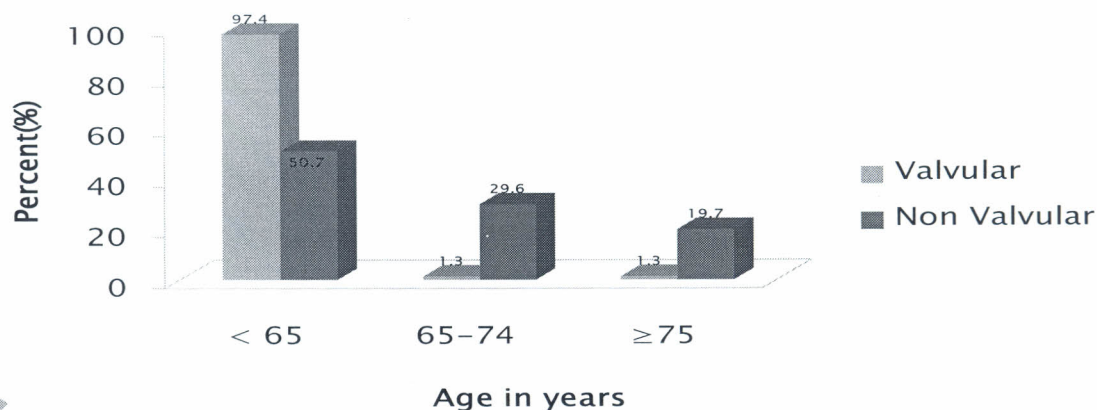# DEMOGRAPHICS–VALVULAR VS NON–VALVULAR AF

AGE<65yrs P 0.000

There were more females than males attending the Medical outpatient Clinics (Mopc) with valvular AF (77.2%) for reasons alluded to above
Marital status, occupation and level of education was similar to non-valvular AF

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CORONARY ARTERYDISEASE			1	
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9.36 Class of AF

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ACC/AHA/ESC Class of AF

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4.7% of the patients were on a rhythm-control strategy with amiodarone

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CARVEDILOL	75	35.5
ATENOLOL	44	20.9
AMIODARONE	10	4.7
PROPANOLOL	6	2.8
VERAPAMIL	2	0.9

TOTAL 211

(Most patients were on more than one pharmacological agent)

DRUGS USED IN RX

Bar chart showing percentages of drugs used: DIGOXIN 73.5, B-BLOCKERS (35.3, 20.9, 2.9 segments), AMIODARONE 4.7, VERAPAMIL 0.9. Y-axis labeled % from 0 to 80.

9.38 Effectiveness of therapy

Rate-control was effective in 44 (43%) of the patients on this strategy one month after initiation of therapy and a greater proportion 42 (56.9%) on contact during this study.

RESTING HEART RATE IN ONE MONTH

Histogram of resting heart rate. Y-axis: Frequency (0 to 25). X-axis: BEATS /MIN (0 to 250).

RESTING HEART RATE ON CONTACT

Heart rate/ minute

9.39 ANTITHROMBOTIC USE

81% of the patients were on some form of anticoagulation with 60% on Warfarin. This proportion was higher for Valvular AF at 90% the remainder were almost all on aspirin The doses of Warfarin used ranged from 2.5mg to 12.5 mg, with most of the patients being on 5mg. This is a higher dose than that recorded in western literature of an average of 3mg daily. It is not clear if genetics could explain this or need for greater intensity of anticoagulation in valvular AF

ANTITHROMBOTIC USE

9.4 INR MONITORING

INR monitoring in the preceeding six months was only done two and a half times on average instead of the expected four to six times (4-6 weekly).

FREQUENCY OF INR MONITORING IN 6/12

NUMBER OF INR MEASURES

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INTENSITY OF ANTICOAGULATION

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Documented Major bleeding episodes were negligible in this population. This may have been due to under-reporting.

Complications of AF or it's treatment

Bar chart titled "Complications of AF or it's treatment" with y-axis labeled "Percent(%)" ranging from 0 to 70. Categories on x-axis: ThromboEmbolic Episodes, Heart Failure, Major bleeding episode, AF related hospitalization. Legend: Valvular, Non Valvular, Total AF.

- ThromboEmbolic Episodes: Valvular 12.7, Non Valvular 12.7, Total AF 12
- Heart Failure: Valvular 63.3, Non Valvular 40.8, Total AF 46.9
- Major bleeding episode: Non Valvular 2.8, Total AF 0.2
- AF related hospitalization: Valvular 13.9, Non Valvular 12.7, Total AF 13.7

41

10 <u>DISCUSSION</u>

In this study, ECG confirmation at diagnosis of AF was only present in 55% of the patients. This is poor practice and may be due to system failures with Electrocardiographic machines not being available in the out-patient clinics, inadequate patient contact time and distant review dates. 10.4% of the study patients had the study ECG confirming their clinical diagnosis of AF

Our study demonstrated a younger mean age (48yr) for AF patients 43% of our study patients were aged 40yrs or less, western literature indicates a mean age of 75 years. This attributable to Valvular heart disease in our set-up of Rheumatic origin being the commonest cause of Atrial fibrillation. Rheumatic heart disease is of juvenile onset

Female gender predominated at 68% of our AF population. This could be explained by patient demographics in our set-up, which in local studies consistently demonstrate more female than male patients at approximately 1: 1.5. This may also indicate differing health-seeking behavior with females being more faithful to attend out-patient reviews than males

Could AF in the setting of Valvular heart disease have a Female predilection? This question may be worth considering
Hypertension was present as a cormobidity in 28.9% of our patients ; western literature indicates hypertension is the single most prevalent co-morbidity in AF at 37%.
CHF was only present as an aetiological factor in 2.4% this defers from European statistics that put it at 9%. We considered this to indicate some measure of negative selection where the high morbidity and mortality of AF in the setting of CHF ensured that this patients were unavailable for out-patient follow-up, having either previously demised or been hospitalised

Our study population had a higher occurence of permanent AF this may indicate that in rheumatic valvular disease AF occurs earlier and tends to be persistent. In only 1.4% 0f our patients was the AF documented as intermittent. The majority of our study patients had not been characterised though by the time of contact

About 10% of our AF patients were not of any treatment strategy this may be plausible if they already had inherent rate control (AV nodal disease). However considering the young age of the study patients this high percentage is more likely due to poor practice or diagnosis in doubt

This study demonstrated a low rate of successful rate control of 42% one month after initiation of therapy increasing to 57% on contact. This is probably due to inadequate titration of medication by the physicians or patient poor compliance on their medication. It is commendable that 81% were on antithrombotics this compares well with a recent study on physician prescribing habits in Zimbabwe where only 38% were on antithrombotics (33)

Our patients were on higher mean doses of Warfarin at 5mg in contrast to Western literature which puts it at 3mg. This may be a function of genetics, it also notable that valvular AF may need greater intensity of anti-coagulation to cater for both the arrhythmia and procoagulant turbulence at the damaged valves

This study demonstrated a Low incidence of major bleeding episodes could this have been due to under-reporting or could these patients have been negatively selected for also.

11 <u>CONCLUSION</u>

Atrial fibrillation in our set-up is predominantly valvular in aetiology. Our patients are mostly young, it has a point prevalence of ~3% in the out-patient setting.
ECG documentation of AF diagnosis is in adequate in our set-up and we are not classifying our AF patients satisfactorily.

Rate control is the commonest strategy in use in keeping with existing guidelines and the vast majority of our patients are on antithrombotic therapy.

Heart-failure is the commonest complication of AF recorded in this study and major bleeding episodes were negligible

12 <u>RECOMMENDATIONS</u>

Scaling up of diagnostic ECG; this will ensure timely commencement of appropriate thereapeutic interventions. Frequent or Ambulatory ECG's will also assist in classifying our patients according to AF type.

Prevention and treatment of Valvular heart disease will pre-empt the development of AF and associated morbidity/ mortality. Correction of Valvular pathology will allow for measures to restore NSR

Further evaluation of non-valvular AF to allow for treatment and lowering of attendant morbidy/mortality

Prevention and treatment of hypertension may reduce the prevalence of non-valvular AF.

Adequate rate-control titration should be encouraged

Improved monitoring of Antithrombotic medication use especially Anticoagulation through INR

Continued adherence to guidelines on management of AF is encouraged.

Further studies should be carried out to investigate causality especially for non-valvular AF

12 STUDY LIMITATIONS

Prevalent case bias occur resulted some etiological associations being under-reported

Tertiary referral hospital bias the patients on follow up at the general and Specialist Medical clinics were highly select. However, the hospital also serves as a primary care centre for the Nairobi city and its environs with a population of over 2 million people.

Reliance on the patient notes and on the clinical skills of the Clinicians; this was minimal though because of the presence of documentary evidence with ECG tracings and lab reports

Cause-effect relationship was not established

13 APPENDICES

13.1 *THE STUDY PROFORMA*

DEMOGRAPHICS

Age ☐

Gender   M ☐   F ☐

Occupation ☐

Educational background; **Primary**

Post primary ☐

Uneducated ☐

Marital status; Single ☐

Married ☐

2 CLINICAL CHARACTERISTICS

2.1 Social History;

Smoking;

Current Smoker ☐

Past smoker (>1 yr) ☐
None ☐

Alcohol intake;

Moderate (<3 standard drinks per session) ☐

Excessive (>3 standard drinks per session) ☐
None ☐

Exercise
Regular ☐

Not regular ☐

Not Ascertained ☐

2.2 Chronic Medical illnesses

Hypertension ☐

DM ☐

CAD ☐

2.3 Aetiological Factors

Valvular hrt dz ☐

Chronic hrt failure ☐   Date of dx ☐

Ischaemic Hrt dz ☐

Hypertensive hrt dz ☐

Hyperthyroidism ☐

Lone AF ☐

OTHER CAUSES   (COPD, POST CARDIAC SURGERY,
CARDIOMYOPATHY ,POST NON CARDIAC ─────────
SURGERY,ALCOHOL, DRUGS)

Unascertained ☐

2.4 Duration of AF

DATE OF DIAGNOSIS ☐

Type of AF-

Paroxysmal ☐

Chronic ☐

Intermittent ☐

Unascertained ☐

2.5 Treatment Modality

Pharmacological   Y [ ]   N [ ]

Drug/s [ ]   Dose/s [ ]

Date/s first used [ ]

Date/s used consequently [ ]

Non Pharmacological

Electrical Cardioversion [ ]   No. of Attempts [ ]

Date/s [ ]

Cardiac Surgery [ ]   Date/s [ ]

Drug treatment category

Anti-arrhythmic [ ]

Rate-control [ ]

Both [ ]

None [ ]   Reason [ ]

Resting heart rate one Month after initiation of therapy [ ]

Resting Heart rate on contact [ ]

13.2 CONSENT FORM EXPLAINATION

My name is Dr. Daniel Nduiga, I am a Post Graduate doctor studying at the University of Nairobi.
I would like to introduce You to a study I am conducting , entitled;

DEMOGRAPHIC, CLINICAL AND LABORATORY CHARACTERISTICS OF ATRIAL FIBRILLATION AS SEEN IN MEDICAL OUT-PATIENT CLINICS AT THE KENYATTA NATIONAL HOSPITAL

What is the study about?

The study is about documenting the variables that characterize patients who have this common abnormal heart rhythm. How were treating it, what causes it and its complications.

What does the study involve?

The study involves perusing through your patient file for information about your illness, taking history from you, examining you which will include taking your pulse and blood pressure.
It also involves performing a study Electrocardiogram. This is the electrical tracing of your heart activity that was used to diagnose your condition.
All information you shall provide shall be kept confidential.

Are there any dangers involved?

There are no risks to any of these procedures all of which are routine and necessary for your proper management.

Will I benefit from the study?

Yes. First the study Electrocardiogram tracing will be inserted into your file providing an evaluation of the current state of your heart. Secondly knowledge about the management of your condition and things you can do to ensure you stay healthy will be imparted to you during the encounter. Thirdly, after analyzing this study will provide useful information that will be used to address this illness more accurately and correct areas where we have not been providing optimum care to patients like you.

Can I withdraw from the study?

You are free to withdraw from the study and this shall not affect your care or treatment. However we encourage you to remain in the study for your benefit and the benefit of other patients.
If You have any further questions, feel free to contact me on 0733-638214 or the secretary of the Kenyatta Hospital Research and Ethics committee on extension 44102
Thank you for your co-operation

13.3 CONSENT FORM

I, Dr Daniel Nduiga, a postgraduate student in the department of Clinical Medicine and Therapeutics of the University of Nairobi, am conducting a study on Patients with Atrial Fibrillation patients. This is a non interventional study looking at how patients with Atrial Fibrillation are treated at the KNH.
This study has been approved by My department and by the KNH Ethics Committee.

 If you agree to participate in this study, I will access your file and get information on the cause of your Atrial Fibrillation and other clinical parameters related to your condition. I will also perform a clinical examination on You to ascertain Your current state of health, I will then perform an Electrocardiogram on You to document Your heart's activity.
 I will encourage you to attend clinics and educate You on how to better care for Yourself. The results of this investigation will be availed in your file at the next visit.
Participation is free and you are free to refuse consent. Your refusal to participate or withdrawal from the study will not in any way affect the quality of your treatment.
All the information obtained will be treated confidentially.

I .... of .... understand the above and voluntarily accept to participate in the study.

Signed ....

I confirm that I have explained to the patient the above statement

Signed .... (interviewer)

TABLES AND CHARTS

TABLE 1

...an College of Chest Physicians recommendations for anticoagulation
...nic atrial fibrillation (21)

...roup   Recommendation*
        Aspirin (325 mg/day)
...ate   Aspirin or warfarin (target INR 2.5; range 2.0-3.0)
        Warfarin (target INR 2.5; range 2.0-3.0)

...ts are classified into the following risk groups:

        Patients with risk factors including prior transient ischemic attack,
        systemic embolism or stroke; history of hypertension; clinical evidence of valve
...isk   disease (rheumatic mitral valve disease or prosthetic heart valve);
        heart failure or impaired left ventricular function on echocardiography;
        diabetes mellitus; or age ≥75.

...ate risk   Patients age 65 to 75 years with no other risk factors

...isk   Patient under age 65 with no other risk factors

...ents treated with warfarin (INR 2.0 to 3.0) who have coronary heart disease, it is
...table to add aspirin in doses up to 100 mg/d for added prevention of ischemic coronary
...s, although this combination is associated with a higher risk of bleeding than treatment
...ither agent alone.
...ual lower-risk patients may rationally choose anticoagulation over aspirin therapy to gain
...r protection against ischemic stroke if they value protection against stroke much more highly
...reducing risk of hemorrhage and burden of managing anticoagulation.

The AAFP/ACP guideline on first-detected AF reached the following major conclusions;
Rate control with chronic anticoagulation is recommended for the majority of patients with AF.
Beta blockers (eg, atenolol or metoprolol) and the calcium channel blockers diltiazem and verapamil are recommended for rate control at both rest and exercise.
Anticoagulation should be achieved with adjusted-dose warfarin unless the patient is considered at low embolic risk or has a contraindication. Aspirin may be used in such patients although the evidence of benefit is not conclusive
When rhythm control is chosen, both DC and pharmacologic cardioversion are appropriate options.
To prevent dislodgment of preexisting thrombi and to allow such thrombi to organize, warfarin therapy should be given for three to four weeks prior to cardioversion unless transesophageal echocardiography demonstrates no left atrial or left atrial appendage thrombi. Anticoagulation with either approach is continued for at least one month after cardioversion
After cardioversion, antiarrhythmic drugs to maintain sinus rhythm are not recommended

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